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A MICRO-LEVEL ANALYSIS OF THE CHANGE OVER TIME IN PERSONAL PROJECT SYSTEMS

by

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B.Sc., University of British Columbia, 1983

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ABSTRACT

Considered within a life domain framework, this is a longitudinal study of three individuals who completed weekly Personal Projects Matrix reports. These data reveal directional change over time in terms of modifications to identifiable project system groups. Each individual displays characteristic patterns of change with respect to the life domain measures of importance, difficulty, enjoyment, importance to quality of life, and time discrepancy. The life satisfaction variable also proves central to directional modification over time. Patterns diagnostic of each individual's progress, and patterns common across individuals are discussed.

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INTRODUCTION

The work under discussion grew out of my interest in changes which take place in adults' lives over time: specifically, changes in their phenomenal experience of reality, their activities, and their subjective appraisals of those activities. As much as possible, I hoped to bridge that all too familiar gap between "psychologically valid" constructs and the individual's experiential perception of day to day existence. The former, in a search for methodological rigor and statistical validity, often becomes an elegant exercise in developing trivial and unsatisfactory explanations of behavior (Carlson, 1971). The latter, while no less concerned with personal realities, has been avoided by a majority of investigators. Nevertheless, this subjective approach has received considerable theoretical attention over the past decade. Most of this attention has focussed on theoretical considerations (eg. Gergen, 1980, Gubrium & Buckholdt, 1977, Krebs, 1974, Riegel, 1975, 1976, 1977) and has not been matched by empirical investigation.

The present study attempts to provide a working model of individual change which is amenable to such empirical application.

THE RUDIMENTS OF A MODEL OF CHANGE

Any attempt to investigate the changing nature of the individual's subjective-experiential universe must first posit an empirically compatible model of change. Such a model must consider three basic elements: 1) what constitutes a valid description of the "psychological person"? 2) What is the nature

of change over time? (ie. what are the components of change processes?) 3) What is the mechanism, or process, of change? An examination of the theoretical literature provides some potential answers to these questions.

The first part of a valid description is best stated in terms of the individual's phenomenal experience (Kelly, 1963). People construct their own conceptions of reality, and it is this phenomenal reality which provides the context of their thoughts, actions, affective responses and transactions with their world. Thus, in a distal sense, change must be considered in terms of that phenomenal reality. In a proximal sense, change would be measured in terms of the persons's appraisals of their reality and of their transactions with their world.

With respect to the nature of the change process, I find Riegel's (1975, 1976, 1977) dialectic formulations appealing. Riegel's system is basically a developmental psychology. However, it differs from more traditional approaches in that change itself is viewed not solely as outcome (or simply the dependent variable) but as both a dependent and an independent variable: both cause as well as effect. Consistent with the phenomenological perspective, individuals are explicitly viewed in terms of their thoughts, ideas and activities, and these within their historical, sociocultural and developmental milieu. Both the person and their environment are defined as continuously evolving products of their dialectic. Thus, theoretically, people are inseparable from their contexts (and vice versa). Implicitly then, the individual may be fully

described only in terms of their dialectic change processes. Unfortunately, Riegel's early death in 1977 cut short his brief 19 year professional career. Thus, we are left with an appealing, but empirically untried, theoretical model.

When considering the mechanisms of change, aspects of Piaget's (1969) genetic epistemology offers some promising insights. Piaget's evolutionary model of cognitive adaptation features two major concepts: 1) the continuous fitting of old structures into new functions, and 2) the development of new structures to fit old functions under changed circumstances. The first concept, "assimilation", refers to the organism's capacity to handle new situations and new problems with its existing cognitive mechanisms (schemas). The second concept. "accommodation", refers to the process of change through which the organism modifies existing schemas in order to handle situations which are initially too difficult. The two processes are intimately connected in that the novel situation must be partially assimilable, but must also demand some accommodation from the schema. Thus, constant challenge leads to accommodation processes, or modifications to, and elaborations of, existing schemas.

Athough Piagettian theory was developed to account for childhood developmental processes, there seems no reason to suppose that such adaptation ceases in adulthood. As with children, adults are active organisms, coping with their environments, meeting new challenges, and discovering new solutions to problems.

Piagettian theory and Riegel's model find common ground in that both construe development as solidly rooted in previously existing states. Thus, successive states display continuity with the past. Also, as schemas adapt to environmental demand (and to each other), they, in turn, modify what is demanded by the environment. However, the two models also diverge significantly. Piaget focussed on an intrinsic developmental sequence without regard to social/historical context. In contrast, Riegel's dialectic only considers organisms within their developmental and cultural space. Further, the Piagettian model is generally considered as an end-goal process, whereas the dialectic model contains no end-goal, being concerned with open-ended, continually evolving processes.

A synthesis of components from both of these models is seen to offer an empirically testable model of personal change.

A WORKING MODEL OF PERSONAL CHANGE

Individuals necessarily change over time in response to the dialectic imperative shared by all conscious organisms. These changes occur both quantitatively and qualitatively over time. In the first instance, people continually assimilate new information and encounter novel situations. Thus, assimilation leads to quantitative change in informational and experiential stores. The processes of accommodation yield a continuously elaborating informational and response system, thus modifying qualitative descriptions of the individual.

Change processes in the informational-experiential store should be reflected in the individual's phenomenal experience -

in their behaviors, their construals of those behaviors, and the affective status of those behaviors. This may be considered a personality change only if defined within a dynamic personality model such as that proposed by Neugarten and Datan (1973) who saw personality as "an emergent of the interaction between the biological organism and the social context" (p. 55). Clearly, this model is incompatible with the more traditional stable state notions of personality exemplified by trait theories.

The individual's social milieu must also play a major role in change dynamics. People are likely to encounter informational and situational novelty at different rates in different life domain areas. For example, unmarried career persons may well experience more information pressure in the career domain of their lives than they would in the family or recreation domains. The individual's occupational, family-life-stage status would be expected partially to define their information acquisition dynamics.

Again, consistent with both Piaget's and Riegel's models, we would also expect change to be directional in that new states derive from previous states. Thus the psychological structural/organizational history of the person constrains the expression of new states. Implicit in this argument is the fact that, consistent with physics, our concept of time is unidirectional. Thus, change processes within the individual must be correspondingly directional. Theoretically, the individual will differ in a quantitative sense as he or she moves from time 1 to time 2 to time 3 and so on. However,

directional change in internal psychological representations of reality need not lead to strictly veridical outputs in terms of behaviors and appraisals of those behaviors. In a larger (Riegellian) sense the organism's behaviors may be conceived of as emergent properties of its internal organization and its dialectical interaction with external reality. Thus, directionality, as measured by behaviors and subjective appraisals of those behaviors, would exhibit directionality as net change.

It may be helpful to discuss directionality more explicitly at this point. The concept of directionality is best understood by analogy to chemical reactions in solution. Reactions are generally able to proceed in both forward (reactants to products) and reverse (products to reactants) directions. When opposing reactions proceed at the same rate there is no net change in the amounts of products or reactants; this process constitutes a reaction in dynamic equilibrium. A non-equilibrium, or directional, reaction occurs when the forward reaction rate is greater than the reverse reaction rate. These two kinds of process are generally represented as:

$Kr \rightleftharpoons Kp$ (equilibrium reaction)

$Kr \rightharpoonup Kp$ (non-equilibrium reaction)

The developmental model being proposed here would, at the very least, imply the second of these two: a non-equilibrium type directional change in phenomenol measures.

To summarize the main themes of this working model then:

1) individuals necessarily change both quantitatively and

qualitatively in a directional manner over time,

2) change processes should be manifested in the individual's phenomenal experience: in their cognitive and affective construals of their behaviors,

3) pressure for change is likely to occur at different rates in different life domains for any given person.

Empirical validation of the model thus requires the identification of existing information with regard to the following:

1) the different life domain dynamics and their relevance to the person's affective status (eg. life satisfaction)

2) a method of tapping into the person's phenomenal experience

3) a method for measuring directional change processes over time.

The following sections review the relevant information and provide the methodological tools for an empirical approach to the model.

LIFE DOMAINS & LIFE SATISFACTION

It should be noted that the following discussion is limited to life satisfaction as opposed to quality of life (QOL). Although the terms are frequently treated as a unitary construct, they may be differentiated: life satisfaction may be characterized as a response to the perceived quality of life, rather than as a measure of that quality of life (Atkinson, 1977, cited in Palys, 1983). Thus, life satisfaction represents the individual's subjective evaluation of their life, while QOL

is a more objectively definable measure. Given the present study's focus on the individual's affective appraisal of his or her life, the life satisfaction construct seems the more relevant.

A brief review of work dealing with the relationship between life satisfaction and life domain demonstrates a frequent preoccupation with gender differences and developmental trends. Michelos (1980) probably provided the best overview of the existing life satisfaction and life domain literature. His own empirical work centered on life satisfaction as a function of eight life domains: job, family life, housing, friendship, free time activity, health, financial security and education. Working with a subject pool of university employees, primarily composed of women under 35, he found that the family life and friendship domains provided the best predictors of life satisfaction.

Harry (1976) carried out an analogous study with men grouped by family life stage. Sources of life satisfaction were examined over the groups with respect to the life domains of finances, hobbies, family, friends, health and job. Consistent with Michelos' study, sources of happiness were best predicted by stage of family life. While men with preschool and school age children looked to the family as their major source of satisfaction and happiness, both the single men and the parents of teens derived their satisfactions from non-familial sources. Although this study was confounded by cohort effects, the author suggested that men modify their life satisfaction expectations in response to family stage membership. This theme was echoed by

Neugarten (1976), with her suggestion that domain activities are age-normed and thus stage of family life functions as the best predictor of behavior.

Hall's (1975) examination of pressures from work, self and home in the life cycles of married women also supported this theme. Role conflict and pressures were related to family life stage rather than to chronological age. Work pressures bracketed the at-home, child rearing, stage; family pressures declined over stages, and home pressures increased steadily. Again, this study was cross sectional rather than longitudinal, thus, the proposed developmental sequence must be interpreted cautiously.

Davey and Paolucci's (1980) study differentiated family interactions from those work activities relating to household maintainance. Whereas the former featured high levels of within-family interactions, the latter were primarily solitary activities. Tognoli's (1980) work further suggests that men are largely disenfranchized from, and unaware of, home maintainance activities. Family domain impacts have received a great deal of attention recently, and the reader is referred to a decade-spanning review of the literature for more information (McCubbin, Gamble, Corneau, Patterson & Needle, 1980).

The friendship domain has also received considerable attention. At the most general level, Shulman (1975) found age a good predictor of close relationship patterns: young people tended to have more intimate relationships outside their kin group while adults increasingly limited their intimate relationships to an ever constricting set of kin. This effect

was found for both genders. Another cohort based study (Reisman & Starr, 1978) found that friendship expectations also modified with age: children perceived friends as a sources of pleasure while adults rated friends in terms of usefulness.

Examination of friendship expectations by gender have found strikingly different patterns. Tognoli (1980) found that males tended to engage in structured, non-intimate same sex friendships while depending on women for intimate one-way disclosure and support. Women, on the other hand, tended to have a number of intimate same sex friends. Their expectations of their friends seemed to display cohort effects with respect to expectations of admiration, entertainment, ego-reinforcement and stimulation (Goldman, Cooper, Ahern & Corsini, 1981). However, all groups perceived friends as givers with whom they shared common interests and activities. Interestingly, all groups, other than those over 60, specified intimacy as a friendship criterion; those over 60 focussed on admiration.

In summary, it seems reasonable to anticipate that the activities specific to various life domains will have differential impacts on perceived life satisfaction. There are also indications that these may modify both over the long term and between genders. Unfortunately, longitudinal studies are lacking, either on a long or short term basis. Thus, for present purposes, the potential for short term fluctuations in the relative saliency of various life domains remains unexplored. Note also that, although considerable work has been done in the areas of family life and friendship, little attention has been

paid to other life domains. It must also be noted that the work to date has relied upon normative, cross-sectional techniques. There have been no examinations of changing life domain characteristics over time within the individual.

THE PERSONAL PROJECTS METHOD

The above discussion illustrates how life satisfaction, one aspect of personality, changes in response to within-domain processes and/or events. Within the framework proposed here, it makes sense to study other aspects of personality change as well. This might involve obtaining impressionistic information from people in the life domains that are centrally important to them. The personal projects approach provides such an opportunty.

The Personal Project approach has its roots in Kelly's (1955) theory of personality and relies heavily on his unit, the Personal Construct. It also adopts Kelly's belief that the best way to find out something about someone is to ask them. Although Little (1972, 1976, Little & Ryan, 1979) developed the theoretical/conceptual basis for the Personal Projects Method over the past decade, his formal presentation of the method appeared only recently (Little, 1983). The core construct in the approach, Personal Projects, are most simply defined as the set of activities (both concrete and abstract) which are salient for the individual at the time of the report. Thus, projects take such concrete forms as, for example: "studying for the 421 exam", "renovating the kitchen", "going swimming with Peggy"; and abstract forms such as "sorting out my feelings about Dick",

"dealing with my father's death", etc. In sum, in each report the individual provides a snapshot of what he or she is doing and thinking about - a portrait of his or her phenomenological life.

The format of the actual instrument, the Personal Projects Matrix (PPM), asks respondents to list up to 10 current projects and to then rate the projects along a series of indices. As Little (1983) pointed out, idiosyncratic rating scales can be applied as deemed appropriate to the investigator's area of interest. However, the measures used to date have typically featured cognitive, affective and behavioral constructs.

Although considerable conceptual work has been done with the PPM, published empirical work is scanty. The empirical burden, to date, rests on Palys (1980, Palys & Little, 1983) who used the PPM in two cross sectional studies of perceived life satisfaction and its relationship to the organization of personal project systems. The rating scales applied to individual projects included importance, difficulty, enjoyment, long term importance, time spent, number of others involved, visibility and control. Similar results were obtained from the two groups studied: one of university students, the other of residential community members. It was found that people with high life satisfaction ratings were involved in projects which were more immediately important, more enjoyable and less difficult than were those in the low life satisfaction group. Whereas the high satisfaction group tended to have projects of higher visibility and short term importance, the low

satisfaction group had projects of higher visibility and long term importance. People in the low satisfaction group reported greater responsibility in project initiation and were more likely to retain that control during project execution.

Methodologically, two types of analyses have been applied to PPM data (Little, 1983, Palys, 1980, Palys & Little, 1983). The nomothetic approach pertains to the "comparative" indices - numerical scores which take on value only in comparison with the sample distribution. The second, ideothetic approach, deals with the "ipsative" indices which express relationships among variables within the individual case. Thus, the present methodology allows both for examinations of the individual within a group context and within his or her own context. The PPM provides a method for tapping into the individual's contemporary life experience. However, given the focus of this investigation a number of modifications were applied. The PPM used in this study contained a column requesting participants to classify projects by life domain. Consistent with Michelos' (1980) taxonomy, eight domains were specified: academic/career, family, home, friends, recreation/health, group activities, financial, emotional concerns. The last of these, emotional concerns, identifies projects whose emotional loading has lifted them from the realm of the more functional domains.

Projects would also seem definable in terms of time demands and consequent pressures, thus, projects were also quantified in terms of both actual and desired time allocated - an extension of the procedure used by Palys (1983). While global life

satisfaction ratings were taken, individual projects were also assessed in terms of their long term importance to quality of life.

Thus, the PPM indices actually used in this study included importance, difficulty, enjoyment, importance to quality of life, actual time, desired time and life domain assignment. Other indices common to the Palys (1980) version of the PPM were also included, but not used in the analysis (see Appendix A for the PPM version used in this study).

Any empirical investigation of the individual's changing phenomenological universe requires both an appropriate measure of the individual's perception of his state at any given time, and an appropriate means of identifying change processes and change outcomes over time in those states. The Personal Projects approach (Little, 1983) seems to provide the basis for such an investigation.

The PPM provides a snapshot, a moment in time. To apply the method longitudinally, it is necessary to have a technique that can chart changes in the system; a comparison of snapshots (or a moving picture) so to speak. Conventional statistical techniques may not be well suited to such a task. However, there is an alternative, namely, Wagner analysis.

WAGNER ANALYSIS

This technique has been borrowed from the field of evolutionary taxonomy and, thus, some explanation of its history and application is probably helpful.

Evolutionary phylogenetics is concerned with the

determination of evolutionary relationships between supposedly related species. The problems involved are considerable, as one is faced with three levels of species information which must be integrated into an evolutionary story: that applying to existing related species, or observed taxonomic units (OTU's); that evidence derived from extinct ancestral species; and, probable characteristics of unknown, hypothetically related, species (HTU's). Given these three sets of information, the phlogeneticist must construct the most probable phylogenetic tree. Until recently such phylogenetic trees were largely constructed by inspired guesswork and used but a limited set of the characteristics of the species involved. Only recently have systematic, statistically based, techniques been applied. Although a number of statistical protocols now exist, the Wagner method provides the most theoretically sound and is thus most widely used.

In 1961, Wagner first proposed the theoretical rationale of the approach. Central to his thesis was the inferential basis used to ascribe common ancestry. Simply stated, species which have in common a majority of similar characteristics may be presumed to share a common ancestry. However, evolutionary divergence follows two imperatives:

1) evolution normally proceeds in various directions, and different lines therefore change in different characters and different character complexes

2) there are inequalities in the rate of evolution with respect to the different lines.

Thus, although a limited number of characters may be useful for taxonomic keying purpose, a wide and differentiated array of characters are necessary for phylogenetic analysis. Clearly, measures on a wide range of characteristics permit more finely grained assessments of difference values between the observed and ancestral states.

This notion was followed by Camin and Sokal's (1969) introduction of "parsimony" criteria as the best method of defining evolutionary tree linkages (see also Sneath & Sokal, 1973). The most parsimonious trees show the smallest number of "steps" (changes in integer valued characters). Thus the length of the tree is measure of the number of steps; the preferred tree is that which implies the minimum amount of evolutionary change between OTU's.

The Wagner algorithm, available in the PHYSYS computing package (Farris & Mickevitch, 1981), constructs the most parsimonious tree linking OTU's based on the integer differences between actual character state values (ie. not based on probabilistic distribution criteria). The reader is referred to Appendix C for a more complete discussion and presentation of the Wagner algorithm.

In summary then, Wagner analysis seems appropriate to the present task on two counts. At a theoretical level, there are obvious parallels: if one assumes environmentally influenced directional development, changes in personality measures may be seen as conceptually similar to changes in species characteristics. Secondly, the non-probabilistic linkage

techniques are unaffected by missing data, and provide unambiguous similarity groupings based on the actual available data.

THE EMPIRICAL MODEL

Given the previously discussed theoretical and methodological resources, we are now in a position to chart an exploratory pathway toward the general question: how does the individual's phenomenological world change over the short term? (in the order of one year).

Subjects in the study were asked to complete PPM's on a weekly basis over the period of one year. Thus, comparable snapshots of a set of time points spanning the year long interval were obtained. We might construe each of these snapshots as providing a quantified measure of the phenomenological status of the individual at that time point. They thus reveal the way in which the person appraises their environment and their behaviors, and reveal their affective status with respect to those behaviors. Note that each phenomenological appraisal (PA) state is paired with one defined time point.

Wagner analysis provides a method of tracking the changes in PA states over the time points. Recall that for each time point there are measures on the same set of variables, or "characters". Thus, the data-based requirements of the Wagner are satisfied. If closely related PA states exist, they will appear as a branching family on a Wagner network. The given time sequence requires that the network be rooted at the initial time

point (PA state).

Were change to occur in a purely directional manner, sequential time points would appear at orderly distances from the origin (root). That is, time 1 would be ancestral to time 2 which would be ancestral to time 3, and so on. However, the Wagner allows for reversals, therefore, similar PA states will appear on side branches regardless of their time point location. For convenience, we shall refer to families (or branches) of similar PA states as "phenomenological appraisal of life system" (PALS) levels.

Having derived a Wagner tree describing the relationships between PA states in terms of PALS levels, we must next examine the time sequential nature of PA states over PALS levels. PALS levels progressively distant from the root should contain progressively distant time points if we are to infer directionality. Thus, we must chart PA states by PALS level membership over time. Although we would anticipate oscillations between PALS levels, the sum movement would be directional if there is overall (net) movement from more recent to more distant PALS levels over time. An equilibrium state would obtain if no net movement from more recent to more distant PALS levels occur over time.

An equilibrium process would support either a stability model or a random fluctuation model of individual change over time. Conversely, a non-equilibrium process would argue for time-dependent directional changes in the levels of behavior and their associated cognitions and affect.

The design of the study allowed exploration of two general types of issues. Firstly, at the general, non-temporal level, the individual could be described in terms of the number and types of life domains employed and their relative contributions. It was also possible to assess patterns within domains; that is, the relationships between importance, difficulty, enjoyment, importance to quality of life and time demand ratings. Interactions between domains, either conflictual or facilitative, were also definable.

Secondly, at the temporal level, the Wagner model allowed the investigation of changes between PA states over time. Analysis of the Wagner-defined PALS levels can discriminate between two possible types of change: directional (non-equilibrium) change and random (equilibrium) change. If directional change were obtained, one could then inspect:

1. the characteristics of shifts between and within PALS levels.
2. whether or not specific variables or groups of variables exhibit directionality over the time course.
3. whether or not overall associations as defined in the full set correlation matrix hold equally over different time intervals.
4. how life satisfaction ratings relate to all the above.

Finally, it must be emphasized that this investigation was strictly confined to an examination of change processes over a one year period. It was not possible to infer either antecedent or subsequent conditions. Nonetheless, support for a directional

model of change in the short term would certainly suggest a similar dynamic at a more global level. More extensive studies over much longer periods would be necessary before any conclusions would be possible regarding changes in such a global dynamic. In short, the present study is seen as an examination of one portion of the individual's overall life trajectories through time.

METHOD

SUBJECTS

Three individuals participated in this longitudinal study. For ethical reasons the respondents will be referred to by their pseudonyms throughout the body of the text.

The first subject, Lucille, completed 39 PPM's from October, 1982 to April, 1984. A 23 year old dentistry student, she completed her degree coincident with her last report. Although living with her parents when she began the study, she moved into her own apartment at report 12. Other notable occurrences were her changes in romantic attachment. Between reports 16 to 22, she was ending a relationship with one man while considering the possibility of a serious relationship with another man. By report 23, she was cohabiting with the second man (the man with whom she is still living).

The second subject, Ronny, completed 28 PPM's between October, 1982 and February, 1984. At 25, Ronny was in the first year of a PhD program. By report 13 he had married; consequently, his prior living arrangement (with 2 male roommates) was modified as he and his wife moved into an apartment. His working wife was able to make substantial financial contributions to the household.

The third subject, Jane, completed 18 PPM's between October, 1982 and December, 1983. A 31 year old parent of a 5 year old boy, she lived with a man whom she recently married. At the time of the study's initiation, she had been living with him for

almost one year. Jane worked as a university contract employee and was thus concerned about the security and duration of her job. In fact, her final report coincided with her decision to quit the job and seek other employment. It was also the time when she announced her plans to marry.

THE INSTRUMENT

The PPM (see Appendix A) requests repondents to list up to 10 "projects" with which they are currently involved. As earlier elaborated, projects may consist of any type of salient concern or activity, from "renewing the mortgage" to "sorting out my feelings about Bob" to "painting the hallway".

In the full PPM, subjects rate their projects along 13 indices. As previously discussed, only 7 of the indices were used: Importance, Difficulty, Enjoyment, Importance to Quality of Life (QOL), Life Domain, % Actual Time and % Desired Time. While the first four indices are self-explanatory, the remaining three require some elaboration. The Life Domain index assigns projects to one of eight life domain areas: academic or career, family, home, friends, recreation/health, group activity, financial and emotional concerns. The last two time indices are combined to form the Time Discrepancy variable; that is, the difference score between actual and desired time required for a project (ie. Actual time minus desired time). The respondents also rated themselves on a Life Satisfaction scale with each report.

The Importance, Difficulty, Enjoyment, Importance to QOL and Life Satisfaction ratings are rated on 10-point scales, with 1

indicating the lowest value and 10 indicating the highest value. (see Appendix B).

All three participants completed two PPM's under supervision prior to the start of the study. During the study, PPM's were completed on the respondents' own time and were thus unsupervised. There were no apparent difficulties associated with this regimen. The average reported time required for the exercise was about one half hour.

SUBJECTS' REPORTING SCHEDULES

Given the participation protocols, the author was unable to "enforce" a strictly weekly reporting schedule. Thus considerable variation exists in the reporting schedules.

The first subject, Lucille, completed 39 PPM's from October, 1982 to April, 1984. The report sequence was as follows: October 28, 1982, November 3,22,30, 1982, December 6, 13, 27, 1982, January, 3, 10, 17, 24, 31, 1983, February 7,14, 21, 1983, March 14,21, 29, 1983, April 4, 11, 18, 27, 1983, May 2, 13, 1983, November 24, 1983, December 28, 1983, January 9, 16, 23, 30, 1984, February 6, 13, 20, 27, 1984, March 5, 12, 19, 26, 1984, April 3, 1984. Note that apart from a five month gap from May to November, 1983, the reports were completed on a basic weekly schedule.

The second subject, Ronny, completed 28 PPM's according to the following schedule: October 7, 14, 28, 1982, November 4, 11, 18, 26, 1982, December 1, 16, 1982, January 20, 1983, February 17, 24, 1983, October 4, 11, 26, 1983, November 1, 9, 15, 22, 29, 1983, December 6, 13, 1983, January 3, 17, 24, 1984,

February 1, 7, 14, 1984. As with the first subject, the reports were completed on a more-or-less weekly basis with an eight month break between March to October, 1983.

The last subject, Jane, provided a rather more sporadic schedule of 18 reports: October 7, 14, 21, 28, 1982, November 4, 11, 18, 1982, January 14, 26, 1984, March 18, 25, 1983, April 10, 20, 1983, November 2, 15, 22, 1983, December 12, 17, 1983. A major six month gap occured between May to November, 1983.

MISSING DATA

It should be noted that both the theoretical and calculational bases of the Wagner allow for missing data points (ie. weeks for which there is no PPM report). In the theoretical sense, when constructing the evolutionary relationship between a set of taxa, or species, members of the family are frequently missing (ie. extinct), thus the role of the HTU's. At the calculational level, the parsimony criteria ensures that the removal, or addition, of taxa simply modifies the number of branch memberships - it does not alter branch relationships.

Therefore, with respect to the present study, while one wishes to provide a continuous set of PPM reports, missing time points will not alter the set of relationships obtaining between existing PPM reports. The impact of missing data is felt in terms of the richness of the descriptive framework rather than in the structure of the framework.

RESULTS

CONSTRUCTION OF THE VARIABLES

Any given PPM report provides the respondent's list of current projects: their classification by life domain: their appraised levels of importance, difficulty, enjoyment, and importance to QOL: and the percentage of actual and desired time for each project. An independent life satisfaction rating is also provided. These data are organized to provide the four types of variables used throughout the study:

1. The "totals" variables. There are five totals variables: total number of projects per report ("projects total"); total of the importance scores for all projects per report ("importance total"); total of the difficulty scores for all projects per report ("difficulty total"); total of the enjoyment scores for all projects per report ("enjoyment total"); total of the importance to QOL scores for all projects per domain ("QOL total").

2. The "appraisal" variables. These variables are formed by first grouping projects by life domain and then summing the importance, difficulty, enjoyment and importance to QOL values for all those projects in any given domain. Note that although eight life domains are identified on the PPM, each individual made use of only a subset of the full range of domains. Thus, individuals possessed different numbers of appraisal variables, depending on the number of life domains employed.

3. The "time discrepancy" variable. This variable represents the difference value between the actual time and the desired time total scores for each report. Thus, if, for a given report, the actual time total was 70%, and the desired time was 50%, the time discrepancy value would be 20. If, on the other hand, the desired time were 90%, the time discrepancy value would be -20.

4. The "life satisfaction" variable. This value is taken directly from the life satisfaction rating scale appended to the PPM. This self-rating scale exists on a 1-10 scale with 1 representing the lowest value and 10 the highest.

Thus, for each PPM report we construct a matrix of variable scores as shown in table 1.

PROJECTS		APPRAISALS				
Domain	Number	Importance	Difficulty	Enjoyment	Imp. QOL	Time Disc.
Academic	3	22**	29**	15**	26**	-20
Home	1	4**	7**	1**	1**	10
Family						
Friends						
Recreation	2	12**	14**	18**	7**	-25
Group						
Financial						
Emotional	2	20**	20**	5**	20**	40
Totals	8*	58*	70*	39*	54*	5***

Table 1. An example of the matrix of variables values derived from one PPM report.
Note. In this example only 4 life domains were used. * "totals" variables. ** "appraisal" variables. *** "time discrepancy" variable.

In summary then, for each individual, a full set of variable values were calculated for each sequential PPM report.

TIME-INDEPENDENT ANALYSES

At this level, two analytic tools were employed. Firstly, basic descriptive statistics were applied to the individual variables in terms of their means, standard deviations and ranges over the course of the study. Secondly, the correlation matrix of the full set of variables across PPM's per individual revealed inter-variable relationships. Given the exploratory nature of the study, two-tailed tests of significance were applied to the correlation coefficients.

TIME-DEPENDENT ANALYSES

These sets of analyses were intended to reveal the patterns of change in project systems over the course of the study. Overall, it was important to discriminate between random versus directional change ("directional" in the sense discussed in the introduction). Two techniques were applied to this problem. In the first instance, it was noted that the correlation matrices revealed strong correlations among the appraisal variables within any one life domain. Consequently, the construction of a generalized domain measure was justified (these values were derived from the average of the importance, difficulty, enjoyment and QOL values within any given domain for each PPM report). Values were calculated for each domain, for each PPM report, and then plotted along a time scale (ie. the sequence of PPM reports).

The second temporally based technique involved the application of the Wagner algorithm previously discussed. Given the sequential data matrices (each of which represents one PPM report), the Wagner produces the most parsimonious linkage between the individual data matrices. Unlike the cluster trees usually found in psychological research, the Wagner tree is explicitly designed to clarify the relationship between the matrices of variable values representing each PPM report. Thus, the terminus of any given branch is a time point rather than a variable.

The Wagner trees were characterized by groups of time points that were both closely related and differentiated from other such groups. The tree building process pays explicit attention to the temporal sequence of the data matrices in that the tree is rooted at the first or second data matrix. Thus, distance from the root implies character change distance from the earlier or "ancestral" state. Remember, the data matrix for each week describes the state of the individual at that point in time. Thus, given that we wish to discover the relationships among the total set of time-based states, this technique is particularily appropriate.

Once the Wagner trees have been produced, the groups or families of similar project systems are noted (ie. PALS levels); that is, those data matrices which most closely resemble each other. Next, the individual time points are plotted by PALS level membership and time. It is this process which permits partial discrimination between random change and directional

change over time.

As noted above, the same sequence of analyses were carried out for each of the three participants. In order to present a more coherent, within-individual picture, each case will be presented separately.

CASE 1: LUCILLE

Time-Independent Analyses

Lucille made use of six of the eight life domains (academic, home, friends, recreation, financial and emotional concerns). Table 2 presents the average number of projects per domain type over the 39 PPM reports she completed.

Project Domains	mean	s.d.	range
Academic projects	3.179	1.537	7.00
Home projects	0.897	0.680	2.00
Friend projects	0.333	0.530	2.00
Recreation projects	0.795	0.801	3.00
Financial projects	0.744	1.093	3.00
Emotional concern projects	1.128	0.923	3.00

Table 2. Case 1, average number of projects per life domain per PPM report.
Note. N=39.

Clearly, academic and emotional concern projects were the major, contributors to Lucille's project systems over time. These data were then examined in terms of the proportion of domain projects per report. The reader must bear in mind that the total number of projects varied over reports. As shown in Table 3, academic and emotional concern projects maintained

their primacy when viewed within a proportional framework.

Project Domains	mean	s.d.	range
Academic projects	0.441	0.207	0.830
Home projects	0.125	0.103	0.400
Friend projects	0.041	0.064	0.200
Recreation projects	0.113	0.118	0.430
Financial projects	0.110	0.166	0.600
Emotional concern projects	0.149	0.119	0.330

Table 3. Case 1, average proportion of projects per life domain per PPM report.
Note. N=39.

Given that Lucille used six of the life domains, 24 appraisal variables were created along with the five totals variables and the time discrepancy and life satisfaction variables. Thus, a total of 31 variables were used to describe her project systems. As shown in Table 3, there is considerable variation in the characteristics of these variables. Recall that, as described earlier, the variables no longer exist along same-range scales.

Variables	Mean	s.d.	Range
Projects total	7.18	1.55	7.0
Importance total	51.59	11.61	49.0
Importance academic projects	23.87	11.87	53.0
Importance home projects	5.49	4.49	16.0
Importance friends projects	1.90	3.19	12.0
Importance recreation projects	4.90	5.24	20.0
Importance financial projects	5.74	8.82	27.0
Importance emotional concern projects	8.20	7.25	27.0
Difficulty total	47.77	14.27	63.0
Difficulty academic projects	22.56	11.19	53.0
Difficulty home projects	5.31	4.93	16.0
Difficulty friend projects	2.15	3.98	19.0
Difficulty recreation projects	3.69	4.74	20.0
Difficulty financial projects	5.38	8.01	26.0
Difficulty emotional concern projects	7.61	6.89	26.0
Enjoyment total	35.92	10.41	42.0
Enjoyment academic projects	13.31	9.79	33.0
Enjoyment home projects	5.31	4.16	16.0
Enjoyment friends projects	2.26	3.54	11.0
Enjoyment recreation projects	5.79	6.31	24.0
Enjoyment financial projects	3.33	5.68	28.0
Enjoyment emotional concern projects	5.00	5.25	16.0
QOL total	44.62	10.26	44.0
QOL academic projects	22.44	11.35	46.0
QOL home projects	4.49	4.01	14.0
QOL friends projects	1.08	1.88	8.0
QOL recreation projects	4.03	4.83	18.0
QOL financial projects	5.08	8.03	24.0
QOL emotional concern projects	7.26	6.58	27.0
Life satisfaction	6.18	2.15	9.0
Time discrepancy	1.92	42.76	264.0

Table 4. Case 1 cumulative raw score measures of constructed variables: means, standard deviations and ranges.
Note. N=39.

Table 5 shows the correlations between the number of projects per domain, life satisfaction and time discrepancy. Evidently, conflict exists both between the number of academic and financial projects and between emotional concern projects and life satisfaction. Notable also are the positive correlations between the number of academic projects and life satisfaction and between life satisfaction and time discrepancy.

Thus, it would seem that as Lucille was engaged in more academic activity (the focus of her life as a dentistry student), she experienced higher levels of satisfaction. The second correlation seems more puzzling: the greater the gap between time actually spent on all projects and desired time, the greater her sense of life satisfaction. In other words, she felt best when spending more time on her projects than she wanted to.

	nA	nH	nFr	nR	nFi	nE	T	LS
nA								
nH								
nFr								
nR								
nFi	-55**							
nE								
T								
LS	34*					-42*	39**	

Table 5. Case 1, correlation matrix of number of projects per domain.
Note. Number of academic projects (nA), number of home projects (nH), number of friends projects (nFr), number of recreation projects (nR), number of financial projects (nFi), number of emotional concern projects (nE), time discrepancy (T), life satisfaction (LS).
*p<.05. **p<.01 (two tailed).

A similar examination of the proportion of projects per domain (Table 6) adds more information; conflicts between academic and recreation projects and conflicts between emotional concern projects and time discrepancy. The remaining correlations differ minimally, if at all, from those in table 5. Note the relationships between life satisfaction and emotional concern projects and time discrepancy respectively. It would seem that higher numbers of emotional concern projects are

associated with lowered life satisfaction ratings. Conversely, the greater the time discrepancy (actual time minus desired time) the higher the life satisfaction rating. As a serious student, academic projects made the largest contribution to Lucille's project systems. A high time discrepancy value may well have indicated the absence of time pressures; that is, the time demands for academic projects were being met.

	pA	pH	pFr	pR	pFi	pE	T	LS
pA								
pH								
pFr								
pR	-33*							
pFi	-53**							
pE								
T						-41*		
LS	35*					-42**	39*	

Table 6. Case 1, correlation matrix of percent of projects per domain.
Note. Percent academic projects (pA), percent home projects (PH), percent friends projects (pFr), percent recreation projects (pR), percent financial projects (pFi), percent emotional concern projects (pE), time discrepancy (T), life satisfaction (LS).
*p<.05. **p<.01 (two tailed).

Correlations of the major variables (Table 7) revealed strong correlations between the importance, difficulty, enjoyment and importance to QOL measures for any given domain. A similarily strong relationship was found between the "totals" values. Of greater interest are the smaller, and often negative relationships. For instance, the conflicts between : academic and financial variables, life satisfaction and home and recreation

	P	IT	I1	I3	I4	I5	I7	I8	DT	D1	D3	D4	D5	D7	D8	ET	E1	E3	E4	E5	E7	E8	QT	Q1	Q3	Q4	Q5	Q7	Q8	LS
P																														
IT	.92																													
I1	.48	.45																												
I3																														
I4																														
I5																														
I7		-.54																												
I8	.42	.46																												
DT	.88	.84	.41‡					.54																						
D1	.49	.43	.90				-.65		.49																					
D3			.83					.42																						
D4				.88																										
D5					.86																									
D7		-.48				.97		-.60																						
D8	.48	.54					.92	.63																						
ET	.74	.59	.48		.45			.53	.47																					
E1			.81			-.54		.76						-.55		.53														
E3				.82					.73																					
E4					.97					.87						.43														
E5						.93					.80																			
E7		-.48					.85		-.57					.77			-.50													
E8	.48							.63	.48						.54															
QT	.86	.85	.48						.78	.39‡						.40‡	.61													
Q1			.94				-.49		.86					-.43		.52	.86				-.46		.49						
Q3				.88						.75								.79												
Q4					.92						.93					.39‡			.90											
Q5						.94						.87								.84										
Q7		-.51					.99		-.63					.97			-.53				.82			-.47					
Q8	.43	.49						.96	.57						.92							.59								
LS								-.39‡									.50	-.42								-.49			-.41‡	
T																													-.41‡	

Table 7. Case 1, correlation matrix of projects by domain standard scores.
Note. Number of projects (P), Importance total (IT), Importance academic projects (I1), Importance home projects (I3), Importance friends projects (I4), Importance recreation projects (I5), Importance financial projects (I7), Importance emotional concern projects (I8), Difficulty total (DT), Difficulty academic projects (D1), Difficulty home projects (D3), Difficulty friend projects (D4), Difficulty recreation projects (D5), Difficulty financial projects (D7), Difficulty emotional concern projects (D8), Enjoyment total (ET), Enjoyment academic projects (E1), Enjoyment home projects (E3), Enjoyment friends projects (E4), Enjoyment recreation projects (E5), Enjoyment financial projects (E7), Enjoyment emotional concern projects (E8), QOL total (QT), QOL academic projects (Q1), QOL home projects (Q3), QOL friends projects (Q4), QOL recreation projects (Q5), QOL financial projects (Q7), QOL emotional concern projects (Q8), Life satisfaction (LS), Time discrepancy (T).
‡p<.05. All other values p<.05. (two tailed).

projects. Life satisfaction is most highly correlated with enjoyment of academic projects. The "totals" variables are also most highly correlated with academic variables. This result is hardly surprising in that academic projects constituted the major proportion of projects overall.

Time-Dependent Analyses

1. Domain Fluctuations Over Time

As earlier discussed, generalized domain measures were calculated for each of the domains. When plotted over the course of the study no clear overall pattern was readily discernable (Figure 1). What was evident however, were the substantial fluctuations in specific domain contributions over time. Clearly, the academic domain dominated Lucille's project systems overall. Generally, the recreation, financial and emotional concern domains operated at the expense of each other; high values in one domain were generally accompanied by low values in the remaining two.

2. Wagner Analysis

The second technique, Wagner analysis, produced a tree characterized by four distinct groups of projects system types, or PALS levels (Figure 2). Thus, the projects systems at time points 23,24,22,21,5,20,19 and 26 form one group (PALS-A) as differentiated from the project systems resident in the other three groups. As noted in the Introduction, we shall refer to the groups as representative of "Phenomenological Appraisals of Life System" (PALS) levels or states hereafter. Thus, Wagner groupings of PPM time points refer to diagnosable PALS states

shared by PPM reports at different time points. The term "level" applies in that the Wagner protocol necessarily defines each group as progressively more distant from the initial rooting data matrix. Recall that the Wagner algorithm determines level membership of the basis of matrix value similarities, regardless of temporal sequence. Thus, the actual Wagner groupings (PALS states) are time independent. Levels are not, however, used in the sense of better or worse, but merely as progressively differentiated from the origin. Two transitional elements are also noted on the Wagner tree. Time points 7, 10, 15 and 9 fall between PALS levels A and B, while time points 11 and 12 fall between levels B and C.

The next level of analysis requires an examination of the temporal sequence of individual project systems over the PALS levels identified above. Figure 3 identifies this sequence. Clearly, there is an overall directional movement over the period of the study. This directionality is characterized by oscillations between PALS levels and periods of within-level stability. The progress over time may be further differentiated to provide six identifiable stages (Figure 3). The term "stage" applies in that succesive stages are sequenced over time.

Thus, while PALS membership is time-independent, stage membership is explicitly time-dependent. However, the actual PALS levels are progressively more distant (in content) from the initial rooting data matrix. Consequently, PALS levels may be considered as relatively more recent or distant from the initial

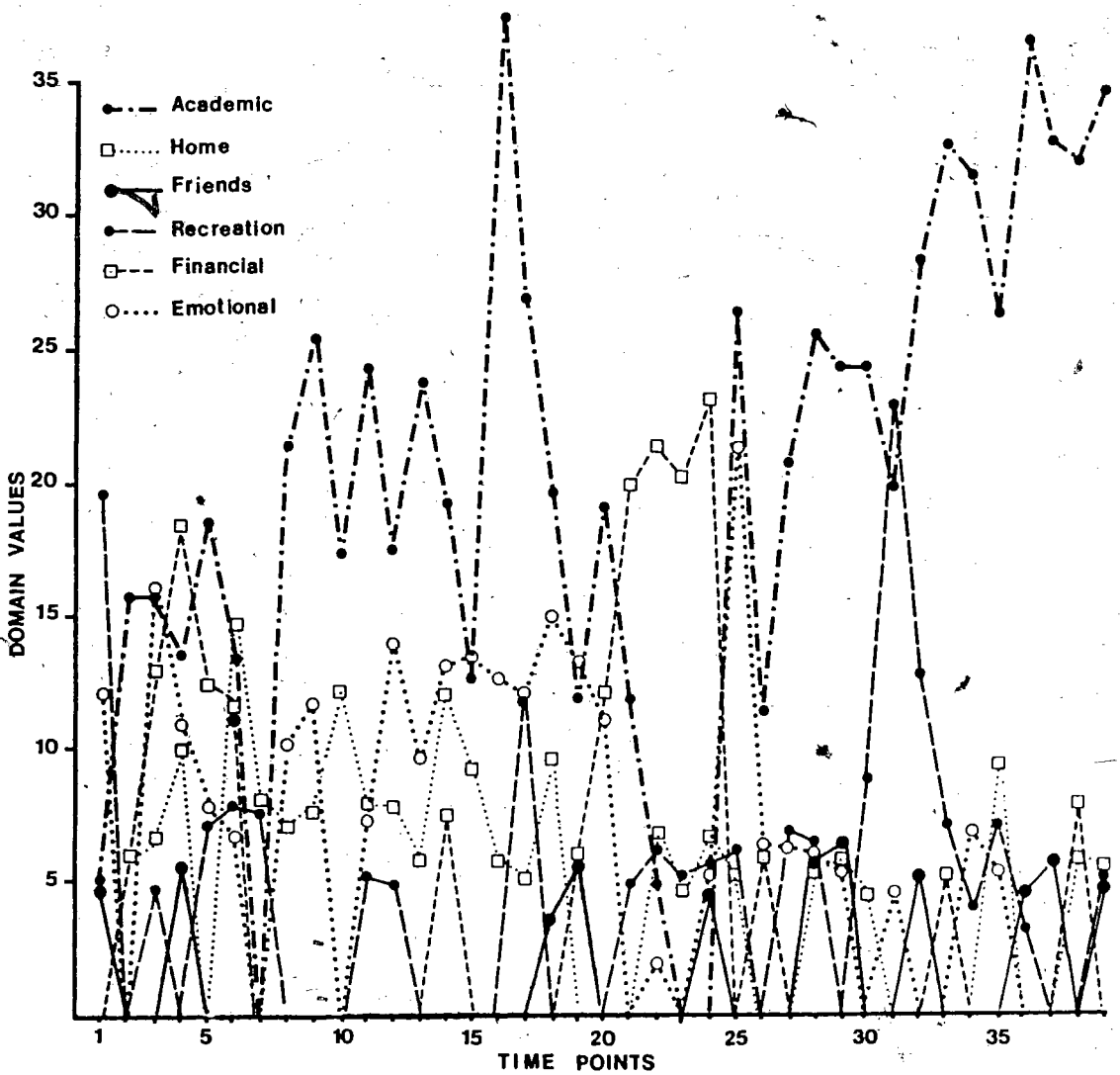


FIGURE 1. Case 1, domain value fluctuations over time.
Note. Domain values represent the average domain importance, difficulty, enjoyment and importance to QOL raw scores per report.

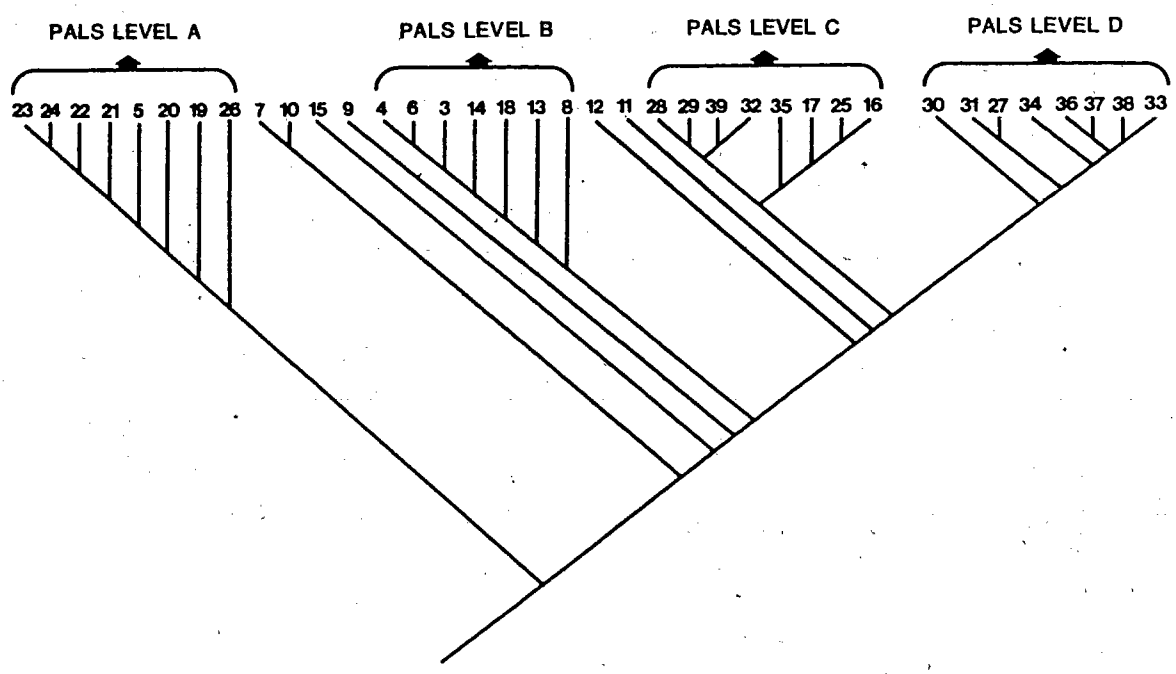


FIGURE 2. Case 1, Wagner tree.
Note. Branch terminals represent PPM time points.

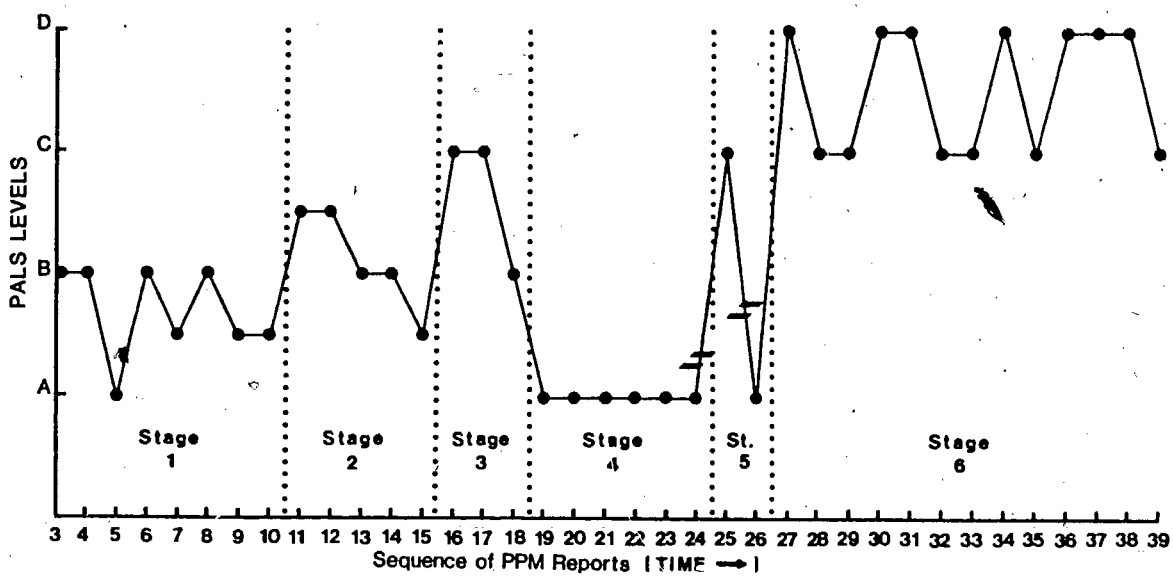


FIGURE 3. Case 1, sequential PPM time points by functional level and stage.
Note. Functional level membership derived from Figure 2.
Broken lines indicate missing time points.

time point in terms of content characteristics.

Given the PALS level and stage sequence of Figure 3 we may now map on the individual variables in an attempt to identify any systematic diagnostic elements of PALS level and stage shifts.

Characteristics of the movements between PALS levels and the movement within PALS level are first examined. Movement between PALS levels can take two forms: upward shifts as in movement from PALS level B at time n to PALS level C at time n+1; and, downward shifts as in downward shifts from PALS level B at time n to PALS level A at time n+1. Movement within PALS levels, or horizontal shifts, occur when, for example, movement from PALS level B at time n to PALS level B at time n+1 is observed. Inspection of figure 3 shows 9 instances of upward shifts, 12 instances of downward shifts and, 15 instances of horizontal shifts. At this point I was interested in basic descriptive statements with respect to shift patterns. In order to do this, the raw values of all 31 variables were transformed into z-normalized values based on the 39 report values for each of the variables. The standardized values of all 31 variables were then mapped onto figure 3. The variable values at the terminus of a shift type (upward, downward and horizontal) were classified as either positive or negative value standard scores. It was then possible to note any extreme characteristics of shift types in terms of the percent of positive value standard scores over all instances of the particular shift type. Thus, as shown in tables 8, 9 and 10, certain variables were typically

associated with the different shift types. Upward shifts showed high values for the academic appraisal variables, QOL total and time discrepancy. Conversely, low values for home, recreation and emotional concern appraisal variables were also evident. It would appear that movement to more distant PALS levels is a reflection of increased academic activity and pressure unencumbered by the other life domains.

Downward shifts, to more recent PALS levels, were characterized by high emotional concern difficulty and low emotional concern importance. High home enjoyment was also noted. The apparent paradox between the emotional concern measures may indicate a kind of "hassle" element; Lucille's emotional concern projects, although difficult, were not seen as important.

The horizontal shifts featured high life satisfaction and time discrepancy. Remember that high time discrepancy indicates that the individual is spending more time on projects than they wish to. This might be due either to a sense of time pressure (ie. not enough time) or to a lack of time pressure (ie. sufficient time to spend on projects that they become less enjoyable). In this case, the low values of the remaining variables contribute to a picture of an unpressured, enjoyable series of shifts. Thus, stable movement within one PALS level occurs in the absence of the academic pressures accompanying upward shifts or the hassles accompanying downward shifts.

Variable	% positive
QOL academic projects	88.9
Percent academic projects	77.8
Difficulty academic projects	77.8
Importance academic projects	77.8
QOL total	77.8
Time discrepancy	77.8
Life satisfaction	66.7
Importance recreation projects	66.7
Percent home projects	33.3
Enjoyment recreation projects	33.3
Importance emotional concern projects	33.3
Difficulty home projects	33.3

Table 8. Case 1, more extreme characteristics of upward shifts.
Note. Values represent the percent positive value standard scores over all 9 instances of upward shifts.

Variables	% positive
Difficulty emotional concern projects	66.7
Enjoyment home projects	66.7
Difficulty recreation projects	33.3
Importance emotional concern projects	33.3

Table 9. Case 1, more extreme characteristics of downward shifts.
Note. Values represent the percent of positive value standard scores over all 12 instances of downward shifts.

Variables	% positive
Time discrepancy	80.0
Life satisfaction	73.3
Importance total	33.3
Difficulty total	33.3
Percent emotional concern projects	33.3
Importance emotional concern projects	33.3
Enjoyment emotional concern projects	33.3
Importance home projects	35.3
Number of projects	26.7
Difficulty recreation projects	26.7
QOL recreation projects	20.0

Table 10. Case 1, more extreme characteristics of horizontal (within group) shifts.

Characteristics of the stages are also worth examining. As in the previous exercise, the proportion of positive and negative standard scores per variable per stage were calculated. If that proportion changes in a directional way (either increasing or decreasing across stages) we may suppose some directional trends in that variable's role over time. As shown in table 11, six variables displayed such movement: four increased across stages and two decreased. Thus, life satisfaction, the number of recreational projects, the enjoyment of academic projects and the difficulty of recreation projects increased over stages. Conversely, total importance and the quality of life invested in home projects diminished over the stages. Remember that Lucille was completing the final year of dental school during the study and, thus, these results provide an interesting dynamic portrait of this period.

Variables	Stages					
	A	B	C	D	E	F
Percent recreation projects	.286	.200	.333	.667	0.0	.769
Enjoyment academic projects	.143	.200	.667	0.0	.500	.923
QOL home projects	.857	1.00	1.00	.333	0.0	.154
Difficulty recreation projects	.286	.200	.333	.333	.500	.538
Importance total	.714	.800	.667	0.0	.500	.385
Life satisfaction	0.0	.400	.667	.833	1.00	.923

Table 11. Case 1, directional change in stage content characteristics.
Note. Content scores represent the proportion of positive standard scores per stage for the variables noted.

Finally, we wish to examine the stability of the full set of variables (Table 6) correlation coefficients. The question here involves the differential nature of the stages in terms of variable correlations. Edwards (1976) provides a suitable test of homogeneity for several values of r:

$$\chi^2 = \sum_{1}^{K} (n_i - 3) z_i^2 - \frac{\left[\sum_{1}^{K} (n_i - 3) z_i\right]^2}{\sum_{1}^{K} (n_i - 3)}$$

This procedure was applied to all the z-transformed correlation coefficients to yield the following two groups: correlations stable across stages (Table 12); and correlations unstable across stages (Table 13). The remaining correlations failed to reach the significance levels used for either the stable or unstable groups.

Correlated Variables	r^2	r	P
Difficulty academic & Difficulty total	.24	.49	.98
Difficulty academic & Enjoyment academic	.58	.76	.95
QOL academic & QOL total	.24	.49	.90
QOL academic & Life satisfaction	.17	-.41	.98
QOL home & Life satisfaction	.24	-.49	.90
Importance friends & QOL friends	.85	.92	.98
Difficulty recreation & Enjoyment recreation	.64	.80	.98
Enjoyment recreation & QOL academic	.21	-.46	.90
QOL recreation & QOL academic	.24	-.49	.90
Difficulty emot. conc. & QOL emot. conc.	.83	.91	.90

Table 12. Case 1, Stable correlations across stages.
Note. P is the probability that all stage correlations are representative of the same population correlation

Correlated Variables	r	P
Number of projects & Importance academic	.48	.05
Number of projects & Difficulty total	.88	.02
Number of projects & Difficulty emotional concerns	.48	.10
Number of projects & Enjoyment emotional concerns	.48	.05
Number of projects & QOL total	.46	.10
Number of projects & QOL emotional concerns	.43	.10
Importance total & QOL total	.85	.02
Difficulty total & Enjoyment total	.53	.10
Difficulty total & QOL total	.78	.10
Importance academic & QOL academic	.94	.10
Difficulty academic & Importance financial	-.65	.10
Enjoyment academic & Difficulty financial	-.55	.01
Enjoyment academic & Life satisfaction	.50	.05
QOL academic & QOL financial	-.46	.01
Difficulty home & Enjoyment home	.73	.10
Difficulty home & QOL home	.75	.01
Importance friends & Difficulty friends	.88	.01
QOL friends & Enjoyment total	.39	.10
Importance recreation & QOL recreation	.94	.10
Enjoyment recreation & QOL financial	.87	.05
Enjoyment recreation & Life satisfaction	-.49	.10
QOL recreation & Difficulty academic	.65	.05
Importance financial & Difficulty financial	.97	.10
Importance financial & Enjoyment financial	.85	.10
Difficulty financial & Enjoyment financial	.77	.01
Enjoyment financial & QOL financial	.82	.10
Importance emotional concerns & Importance total	.46	.01
Importance emotional concerns & Importance academic	.46	.05
Importance emot. conc. & Enjoyment emot. conc.	.64	.01
Enjoyment emotional concerns & Difficulty total	.44	.10
Enjoyment emot. conc. & QOL emot. conc.	.59	.01
QOL emotional concerns & Difficulty total	.57	.10

Table 13. Case 1, unstable correlations across stages.
Note. P is the probability that all stage correlations are representative of the same population correlation.

CASE 2: RONNY

Time Independent Analyses

Ronny made use of four of the life domains (academic, family, recreation and financial). Table 14 presents the average number of projects per domain type over the 28 PPM reports he completed. The evident dominance of academic projects is retained when viewed in terms of the average proportion of projects per domain type (Table 15).

Project Domains	Mean	s.d.	Range
Academic projects	5.393	1.257	5.00
Family projects	0.286	0.600	2.00
Recreation projects	1.179	0.670	2.00
Financial projects	1.464	0.962	4.00

Table 14. Case 2, average number of projects per life domain per PPM report.
Note. N=28.

Project Domains	Mean	s.d.	Range
Academic projects	0.608	0.131	0.556
Family projects	0.031	0.063	0.200
Recreation projects	0.133	0.075	0.250
Financial projects	0.163	0.102	0.400

Table 15. Case 2, average proportion of projects per life domain per PPM report.
Note. N=28.

Ronny's use of four life domains resulted in 16 appraisal variables. Together with the five totals variables, the time discrepancy and life satisfaction variables, 23 variables describe project system. Table 16 provides the average characteristics of these variables over the 28 time points. Note

the comparatively low life satisfaction mean. Also of interest are the discrepancies between enjoyment and importance to QOL means for financial projects versus their difficulty and importance means.

Variables	Mean	s.d.	range
Number of projects	8.89	1.03	4.0
Importance total	60.14	9.60	37.0
Importance academic projects	39.32	9.93	40.0
Importance family projects	1.93	4.00	13.0
Importance recreation projects	7.79	4.51	14.0
Importance financial projects	9.18	6.64	26.0
Difficulty total	61.29	7.31	27.0
Difficulty academic projects	38.32	9.50	41.0
Difficulty family projects	1.74	3.78	15.0
Difficulty recreation projects	6.64	3.14	12.0
Difficulty financial projects	10.32	6.57	29.0
Enjoyment total	46.32	12.14	53.9
Enjoyment academic projects	28.50	10.86	41.0
Enjoyment family projects	1.96	4.26	15.0
Enjoyment recreation projects	6.04	3.24	14.0
Enjoyment financial projects	5.93	5.53	21.0
QOL total	57.43	8.31	39.0
QOL academic projects	39.61	9.35	39.0
QOL family projects	1.14	2.77	12.0
QOL recreation projects	7.96	4.43	15.0
QOL financial projects	6.75	3.79	13.0
Life satisfaction	5.58	1.36	5.0
Time discrepancy	7.71	19.37	73.0

Table 16. Case 2, cumulative raw score measures of constructed variables: means, standard deviations and ranges.
Note. N=28.

Table 17 shows the correlations between the numbers of projects per domain, life satisfaction and time discrepancy. Evidently, financial projects act at the expense of both recreation and home projects. A similar relationship obtains between academic and financial projects.

	nA	nFa	nR	nFi	T	LS
nA						
nFa						
nR		-50**				
nFi	-34*	40*	-42*			
T			-56**			
LS						

Table 17. Case 2, correlation matrix of number of projects per domain.
Note. Number of academic projects (nA), Number of family projects (nFa), Number of recreation projects (nR), Number of financial projects (nFi), Time discrepancy (T), Life satisfaction (LS).
*p<.05. **p<.01. (two tailed).

A parallel examination of proportions of projects per domain echoes the previous analysis. However, the negative relationship between recreation and home projects is exacerbated. A negative academic and recreation interaction also becomes evident (Table 18).

	pA	pFa	pR	pFi	T	LS
pA						
pFa						
pR	-31*	-58**				
pFi	-52**	38*	-46*			
T			-53**			
LS						

Table 18. Case 2, correlation matrix of proportion of projects per domain.
Note. Proportion of academic projects (pA), Proportion of family projects (pFa), Proportion of recreation projects (pR), Proportion of financial projects (pFi), Time discrepancy (T), Life satisfaction (LS).
*p<.05. **p<.01 (two tailed).

As in the corresponding case 1 correlation matrix, correlations of the major variables (Table 19) showed strong

	P	IT	I1	I2	I5	I7	DT	D1	D2	D5	D7	ET	E1	E2	E5	E7	QT	Q1	Q2	Q5	Q7	LS	T
P																							
IT	.84																						
I1	.67																						
I2																							
I5					-.44‡																		
I7						.43‡	-45																
DT	.83	.68	.44‡																				
D1	.52	.92					.55																
D2			.99	-.40‡	.40‡																		
D5			-.52	.85	-.55			-.46‡															
D7						.94	-.41‡		-.41‡														
ET	.69	.73	.49	.40‡			.57	.49	.41‡														
E1	.41‡	.63	.80				.77			.78													
E2			.98	-.45‡	.43‡			.98	-.52		.40‡												
E5			-.39‡	.73	-.48‡				.81	-.41‡		-.38‡											
E7			.47‡	-56	.94			.43‡	-64	.86		.46‡	-48										
QT	.79	.74	.56				.73	.55			.65	.62		.39‡									
Q1	.41‡	.64	.93				.46‡	.90			.57	.84			.66								
Q2			.94						.99	-.39‡		.40‡		.96		.38‡							
Q5			-.47‡	.97	-.47‡			-.42‡	.90				-.47‡	.76	-.59								
Q7		-.41‡	.39‡		.84		-.44‡			.88					.76		-.40‡						
LS																							
T				-.59					-.60														

Table 19. Case 2, correlation matrix of projects by domain standard scores.
Note. Number of projects (n), importance total (IT), importance academic projects (I1), importance family projects (I2), importance recreation projects (I5), importance financial projects (I7), difficulty total (DT), difficulty academic projects (D1), difficulty family projects (D2), difficulty recreation projects (D5), difficulty financial projects (D7), enjoyment total (ET), enjoyment academic projects (E1), enjoyment family projects (E2), enjoyment recreation projects (E5), enjoyment financial projects (E7), QOL total (QT), QOL academic projects (Q1), QOL family projects (Q2), QOL recreation projects (Q%), QOL financial projects (Q7), life satisfaction (LS), time discrepancy (T).
‡p<.05. all other values p<.01. (two tailed).

relationships between the appraisal variables measures for any given domain. Strong to moderate interactions obtain between the totals values. A large number of other moderate interactions are also evident. These may be broadly characterized as negative relationships between: academic and financial projects, recreation and financial projects, and home and recreation projects; Financial and home projects displayed positive interactions.

Time-Dependent Analyses

1. Domain Fluctuations Over Time

Generalized domain measures were plotted for each of the four domains (figure 4). When plotted over the course of the 28 time points, two basic patterns were evident. In both cases the academic measures occupied the highest range, however, in the first case recreation values were higher than financial (time points 1-12, 24-28), while in the second case the converse obtained (time points 13-23). The latter pattern also coincided with the presence of the family domain.

2. Wagner Analysis

Wagner analysis produced a tree characterized by five distinct groups, or PALS levels, of project types (Figure 5). Temporal application of individual project systems over the groups produced a clearly directional four stage temporal sequence (Figure 6).

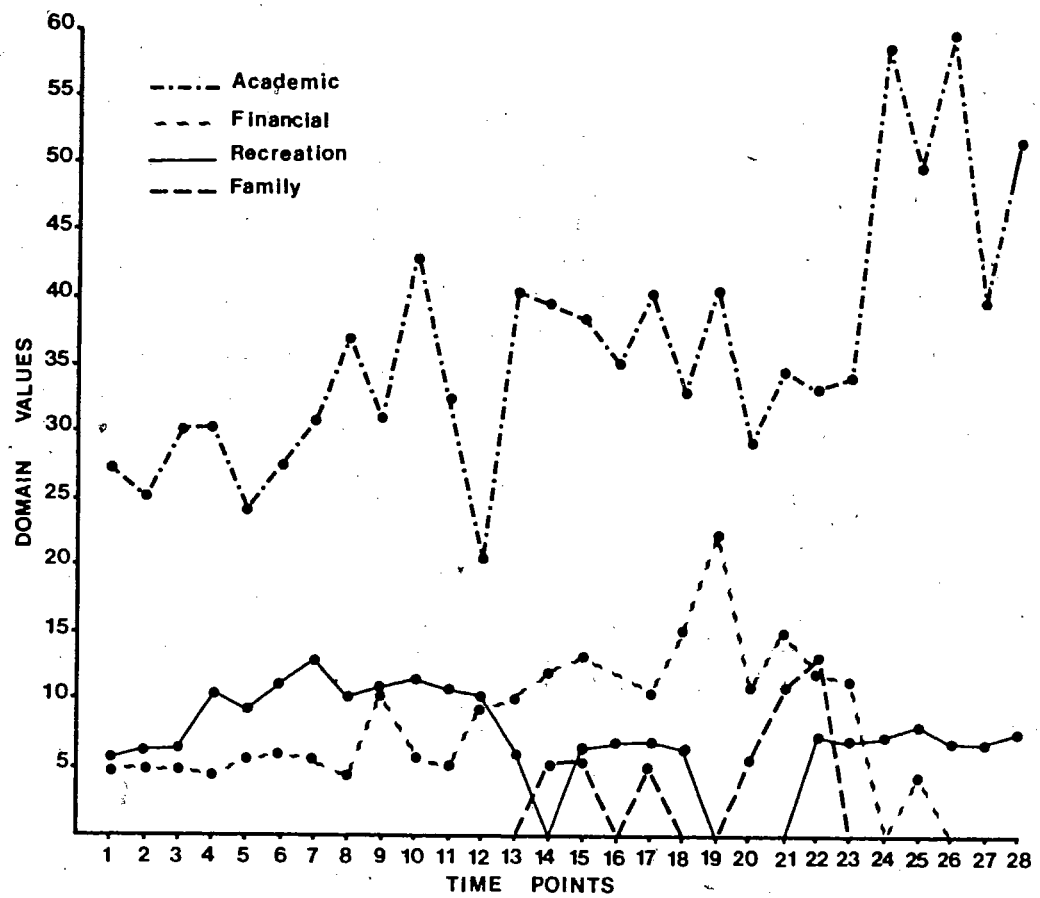


FIGURE 4. Case 2, domain value fluctuations over time. Note. Domain values represent the average domain importance, difficulty, enjoyment and importance to QOL raw scores per report.

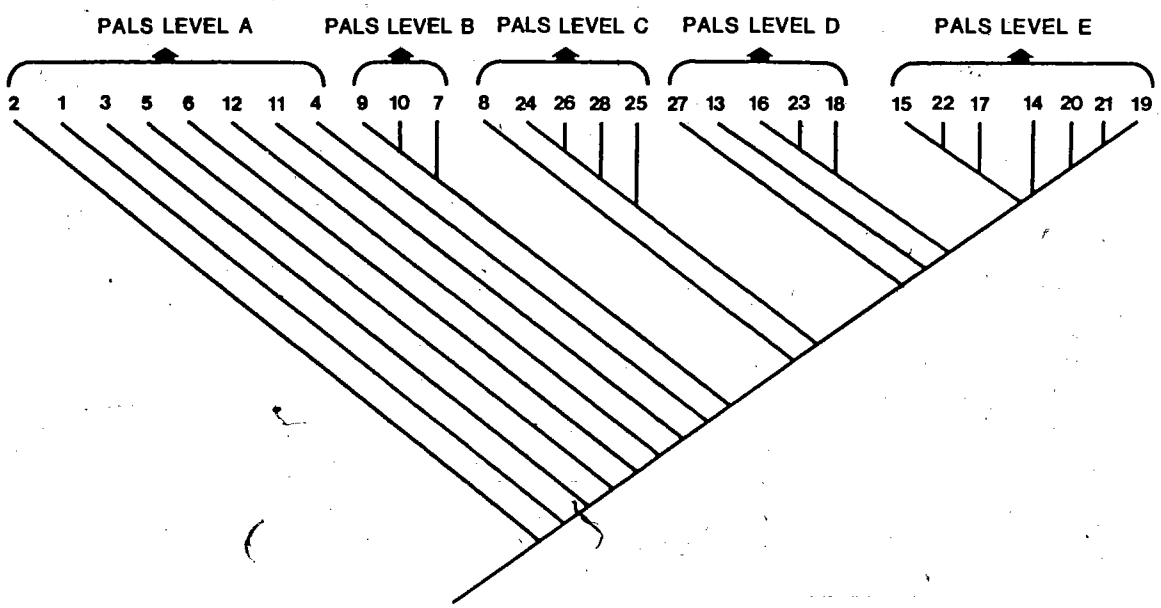


FIGURE 5. Case 2, Wagner tree.
Note. Branch terminals represent PPM time points.

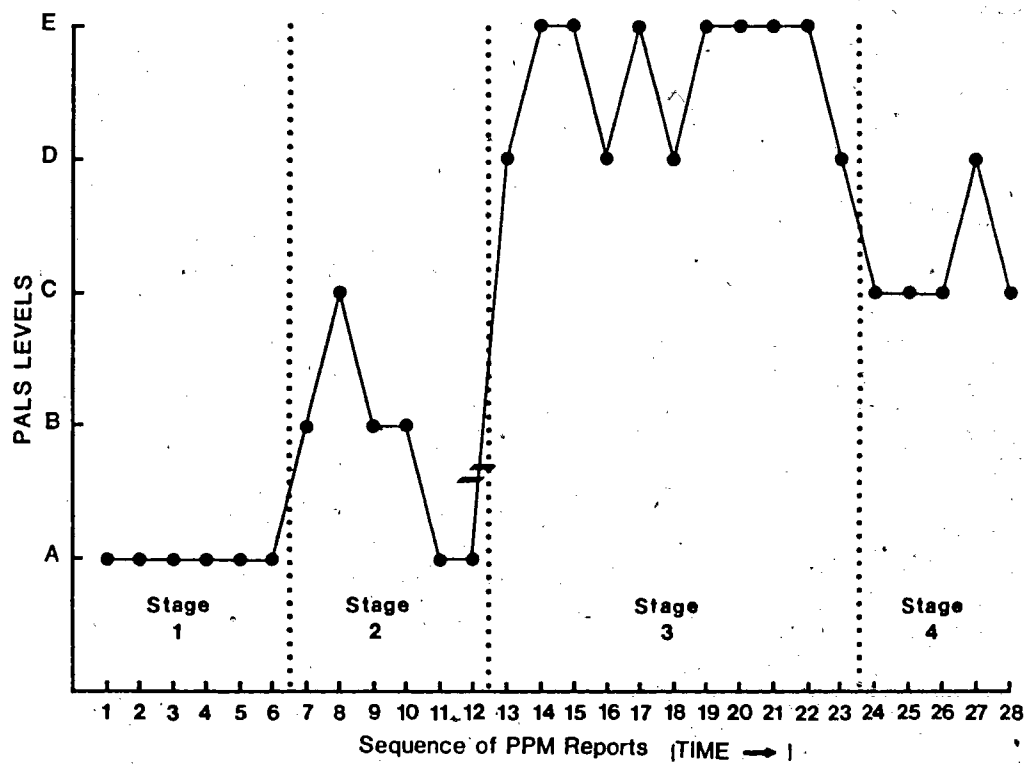


FIGURE 6. Case 2, sequential PPM time points by functional level and stage.
Note. Functional level membership derived from Figure 2.
Broken lines indicate missing time points.

All 31 variables were inspected with respect to variable behaviors associated with shifts between PALS levels over time (Tables 20,21,22,). Upward shifts (from more recent to more distant PALS levels) featured high values of the academic appraisal variables high time discrepancy, high importance and difficulty totals measures. Both life satisfaction and enjoyment total values were low. In sum, this would seem to reflect unhappy periods of high academic pressure.

Downward PALS shifts seem to center about the recreational domain with high total importance and number of projects ratings. The high difficulty and enjoyment of Recreation projects accompanied by the low QOL qnd importance of the recreational projects presents an ambiguous picture. Notably, the enjoyment total and time discrepancy values were low.

The horizontal shifts appear to reflect a satisfying, unpressured period. High life satisfaction values are associated with low values for the academic appraisal variables.

Variables	% positive
Time discrepancy	100.0
Number of projects	85.7
Difficulty academic projects	85.7
QOL academic projects	85.7
Importance academic projects	71.4
Difficulty total	71.4
Importance total	71.4
Life satisfaction	33.3
QOL recreation projects	28.6
Enjoyment total	0.0

Table 20. Case 2, more extreme characteristics of upward shifts. Note. Values represent the percent positive value standard scores over all 7 instances of upward shifts.

Variables	% Positive
Number of projects	71.4
Importance total	71.4
Difficulty recreation projects	85.7
Enjoyment recreation projects	71.4
Importance recreation projects	28.6
QOL recreation projects	28.6
Difficulty academic projects	28.6
Time discrepancy	14.3
Enjoyment total	0.0

Table 21. Case 2, more extreme characteristics of downward shifts.
Note. Values represent the percent positive value standard scores over all 7 instances of downward shifts.

Variables	% Positive
Life satisfaction	83.3
Importance academic	36.4
QOL academic	30.8
Difficulty academic	30.8

Table 22. Case 2, more extreme characteristics of horizontal (within group) shifts.
Note. Values represent the percent of positive value standard scores over all 13 incidences of horizontal shifts.

An examination of the variables with respect to stage content revealed seven variables which showed increasing proportions of positive standard scores across the four stages (Table 23). All of the academic appraisal variables showed an increase across stages, as did three of the totals variables (enjoyment, difficulty and QOL). We might suspect that over this first year of his PhD Ronny became more comfortably committed to his role.

Variables	Stages			
	A	B	C	D
Enjoyment total	0.0	.400	.545	.800
QOL total	.400	.500	.545	.800
Difficulty total	0.0	.500	.545	.800
Difficulty academic projects	0.0	.333	.454	1.00
Enjoyment academic projects	0.0	.333	.636	1.00
QOL academic projects	0.0	.333	.538	1.00
Importance academic projects	0.0	.333	.545	1.00

Table 23. Case 2, directional change in stage content characteristics.
Note. Content scores represent the proportion of positive standard scores per stage for the variables noted.

Finally, the stability of the correlation coefficients across the four stages were examined (Table 24, Table 25).

Correlated Variables	r^2	r	P
Number of projects & Enjoyment total	.48	.69	.90
Number of projects & QOL total	.62	.79	.90
Enjoyment academic & Importance total	.40	.63	.95
Importance recreation & Importance family	.19	-.44	.99
Importance recreation & Difficulty family	.16	-.40	.99
Importance recreation & Enjoyment family	.20	-.45	.98
Difficulty recreation & Importance family	.27	-.52	.90
Difficulty recreation & Difficulty family	.21	-.46	.99
Difficulty recreation & Enjoyment family	.27	-.52	.98
Difficulty recreation & QOL family	.15	-.39	.99
Enjoyment recreation & Importance family	.15	-.39	.98
Enjoyment recreation & QOL total	.15	.39	.99
QOL recreation & Importance family	.22	-.47	.95
QOL recreation & Difficulty family	.98	.99	.99
QOL recreation & Enjoyment family	.22	-.47	.98

Table 24. Case 2, Stable correlations across stages.
Note. P is the probability that all stage correlations are representative of the same population correlation.

Correlated Variables	r	P
Difficulty total & Importance total	.68	.01
Difficulty academic & Importance total	.52	.01
Importance recreation & Difficulty recreation	.85	.01
Importance recreation & Enjoyment recreation	.73	.01
Importance recreation & QOL recreation	.97	.01
Importance recreation & Time discrepancy	-.59	.10
Difficulty recreation & enjoyment recreation	.81	.01
Difficulty recreation & QOL recreation	.90	.01
Enjoyment recreation & Importance financial	-.48	.01
Enjoyment recreation & Difficulty financial	-.41	.01
Enjoyment recreation & Enjoyment financial	-.48	.01
Enjoyment recreation & QOL recreation	.76	.01

Table 25. Case 2, Unstable correlations across stages.
Note. P is the propability that all stage correlations are representative of the same population correlation.

CASE 3: JANE

Time-Independent Analysis

Jane made use of seven of the eight life domains; only the friends domain was excluded. Unfortunately, she completed only 18 PPM's over the year of the study, generally at two weekly intervals. Despite the comparatively low response rate, these data were included, partially to determine how much descriptive richness is lost in a coarser grained report schedule.

As shown in table 26, both the career and family domains occupy main stage, followed by recreation/health. It should be noted that Jane's recreation/health projects were largely of the "go swimming" variety; activities designed to maintain fitness.

Project Domains	Mean	s.d.	Range
Career projects	2.61	0.85	3.00
Family projects	2.28	1.56	5.00
Home projects	0.61	0.70	2.00
Recreation/health projects	1.50	0.98	3.00
Group activity projects	0.50	0.92	3.00
Financial projects	0.83	0.71	2.00
Emotional concern projects	0.33	0.59	2.00

Table 26. Case 3; average number of projects per life domain per PPM report.
Note. N=18.

When viewed in terms of proportion of projects per domain, little change is evident (Table 27).

Project Domains	Mean	s.d.	Range
Career projects	0.298	0.107	0.344
Family projects	0.256	0.180	0.600
Home projects	0.070	0.084	0.250
Recreation/health projects	0.164	0.110	0.375
Group activity projects	0.055	0.103	0.333
Financial projects	0.092	0.081	0.250
Emotional concern projects	0.037	0.064	0.200

Table 27. Case 3, average proportion of projects per life domain per PPM report.
Note. N=18.

Given that Jane used seven life domains, 28 appraisal variables were constructed. When combined with the five totals variables, the time discrepancy and life satisfaction variables, a complete set of 35 variables described Jane's project systems (Table 28). The primacy of the career and family domains are clearly evident. Note, however, that while the enjoyment and importance to QOL values are similar for these two domains, the difficulty and importance measures are clearly discrepant.

Variables	Mean	s.d.	range
Number of projects	8.94	1.26	5.0
Importance total	59.06	10.21	39.0
Importance career projects	20.17	7.11	24.0
Importance family projects	14.17	9.45	30.0
Importance home projects	2.78	3.86	14.0
Importance recreation/health projects	9.78	8.07	26.0
Importance group activity projects	3.83	6.30	18.0
Importance financial projects	4.89	3.94	10.0
Importance emotional concern projects	2.00	4.10	13.0
Difficulty total	35.11	9.58	31.0
Difficulty career projects	14.00	5.58	21.0
Difficulty family projects	6.83	5.91	21.0
Difficulty home projects	2.22	3.23	11.0
Difficulty recreation/health projects	4.61	4.39	14.0
Difficulty group activity projects	2.44	4.27	13.0
Difficulty financial projects	2.72	3.27	11.0
Difficulty emotional concern projects	1.50	3.07	8.0
Enjoyment total	39.17	11.24	41.0
Enjoyment career projects	11.11	6.35	21.0
Enjoyment family projects	10.50	8.76	30.0
Enjoyment home projects	2.44	3.79	10.0
Enjoyment recreation/health projects	7.00	6.23	19.0
Enjoyment group activity projects	3.33	5.55	19.0
Enjoyment financial projects	2.56	2.93	10.0
Enjoyment emotional concern projects	1.11	2.72	7.0
QOL total	62.11	12.21	43.0
QOL career projects	17.94	4.92	17.0
QOL family projects	16.78	11.58	37.0
QOL home projects	2.94	4.18	13.0
QOL recreation/health projects	11.06	8.47	27.0
QOL group activity projects	3.83	6.40	19.0
QOL financial projects	5.78	5.25	17.0
QOL emotional concern projects	2.11	4.81	17.0
Life satisfaction	5.39	1.61	5.0
Time discrepancy	-6.67	25.52	111.0

Table 28. Case 3, cumulative raw score measures of constructed variables: means, standard deviations and ranges.
Note. N=18.

Table 29 shows the correlations between the numbers of projects per domain, life satisfaction and time discrepancy. Notably, only one association shows up.

	nC	nFa	nH	nR	nG	nFi	nE	LS	T
nC									
nFa									
nH									
nR									
nG									
nFi									
nE									
LS		-60*							
T									

Table 29. Case 3, correlation matrix of number of projects per domain.
Note. Number of career projects (nC), Number of family projects (nFa), Number of home projects (nH), Number of recreation/health projects (nR), Number of group activity projects (nG), Number of financial projects (nFi), Number of emotional concern projects (nE), Life satisfaction (LS), Time discrepancy (T).
*p.<.01. (two tailed).

Two additional correlations appear when we examine the proportions of projects correlation matrix (Table 30).

	pC	pFa	pH	pR	pG	pFi	pE	LS	T
pC									
pFa									
pH		-49*							
pR		-51*							
pG									
pFi									
pE									
LS		-61**							
T									

Table 30. Case 3, correlation matrix of proportion of projects per domain.
Note. Proportion of career projects (pC), Proportion of family projects (pFa), Proportion of home projects (pH), Proportion of recreation/health projects (pR), Proportion of group activity projects (pG), Proportion of financial projects (pFi), Proportion of emotional concern projects (pE), Life satisfaction (LS), Time discrepancy (T).
*p.<.05. **p.<.01. (two tailed).

	P	IT	I1	I2	I3	I5	I6	I7	I8	DT	D1	D2	D3	D5	D6	D7	D8	ET	E1	E2	E3	E5	E6	E7	E8	QT	Q1	Q2	Q3	Q5	Q6	Q7
P																																
IT	-.57*																															
I1																																
I2																																
I3		-.47*																														
I5	.63																															
I6																																
I7								-.53*																								
I8																																
DT	.51*																															
D1		.81															.61															
D2			.82																													
D3				.90					-.55*																							
D5					.75																											
D6						.97																										
D7							.68																									
D8								.98																								
ET																																
E1		.83									.75							.54*														
E2			.69																													
E3				.85									.75						.50*													
E5	.48*				.67							.47*																				
E6						.97							.90																			
E7							.61							.79																		
E8								.86							.80																	
QT	.70	.50*			.62				-.48*	.60						-.51*																
Q1		.69																														
Q2			.82	-.56*						.71	-.51*							-.52*	.79												
Q3				.93		-.47*				.84									.82									-.54			
Q5	.49*	.55*			.97						.80								-.48*	.66								.73			
Q6						.98						.99									.91										
Q7				-.50*		.93							.86									.73									
Q8							.91							.80									.91								
LS			-.56*							-.74																		-.62			
T	.57*									-.47*																						

.48*

Table 31. Case 3, correlation matrix of project by domain standard scores.
Note. Number of projects (P), Importance total (IT), Importance career (I1), Importance family (I2), Importance home (I3), Importance recreation/health (I5), Importance group activities (I6), Importance financial (I7), Importance emotional concerns (I8), Difficulty total (DT), Difficulty career (D1), Difficulty family (D2), Difficulty home (D3), Difficulty recreation/health (D5), Difficulty group activities (D6), Difficulty financial (D7), Difficulty emotional concerns (D8), Enjoyment total (ET), Enjoyment career (E1), Enjoyment family (E2), Enjoyment home (E3), Enjoyment recreation/health (E5), Enjoyment group activities (E6), Enjoyment financial (E7), Enjoyment emotional concerns (E8), QOL total (QT), QOL career (Q1), QOL family (Q2), QOL home (Q3), QOL recreation/health (Q5), QOL group activities (Q6), QOL financial (Q7), QOL emotional concerns (Q8), Life satisfaction (LS), Time discrepancy (T).
*p.<.05. all other values p.<.01 (two tailed).

Correlations of the major variables (Table 31) show strong relationships between the importance, difficulty, enjoyment and importance to QOL measures for any given variable. Unlike the other two respondents, the totals values are relatively uninformative. The QOL total functions as an exception however, showing positive associations with importance total, importance recreation/health and difficulty health. Conflict between the difficulty home and enjoyment family variables is also evident. Life satisfaction is negatively correlated with importance and difficulty family as well as with enjoyment career.

Time-Dependent Analysis

1. Domain Fluctuations Over Time

Generalized domain measures were plotted over the time points for each of the seven domains (figure 7). The career and family domains generally dominated Jane's project systems. However, while the career measures tended to decrease over the course of the study, the family domain cycled from high to moderate levels over time. Note also the increased values of the recreational domain in the latter half of the time course.

2. Wagner Analysis

Wagner analysis produced a tree characterized by four groups, or PALS levels, of project types (Figure 8). Temporal application of individual project systems over the groups produced a four stage directional sequence (Figure 9).

In this case the PALS level shift patterns must be interpreted cautiously, given the small sample size. However,

tables 32,33,and 34 present the most consistent patterns. Upward PALS shifts were accompanied by low appraisal values for the home and career domains as well as by low financial difficulty values. This would suggest that movement from more recent to more distant PALS levels occurred when the values of the two dominant domains were at low levels.

Downward shifts, to more recent PALS levels, were characterized by more projects and greater difficulty in the recreation/health domain. At the same time, enjoyment home values were low as were all the group appraisal variables. At first sight, this would suggest stress in terms of over-commitment. However, the picture is far from clear.

Although there were only three horizontal shifts, the high values of life satisfaction, number of projects, time discrepancy and the financial appraisal variables are of some interest. Jane dabbled in the stock market, perhaps these periods reflected success in that area.

Variables	% Positive
Difficulty financial projects	16.7
Importance home projects	16.7
QOL home projects	16.7
Difficulty home projects	16.7
Enjoyment home projects	16.7
Difficulty career projects	0.0
Importance career projects	0.0

Table 32. Case 3, more extreme characteristics of upward shifts. Note. Values represent the percent positive value scores over all 6 instances of upward shifts.

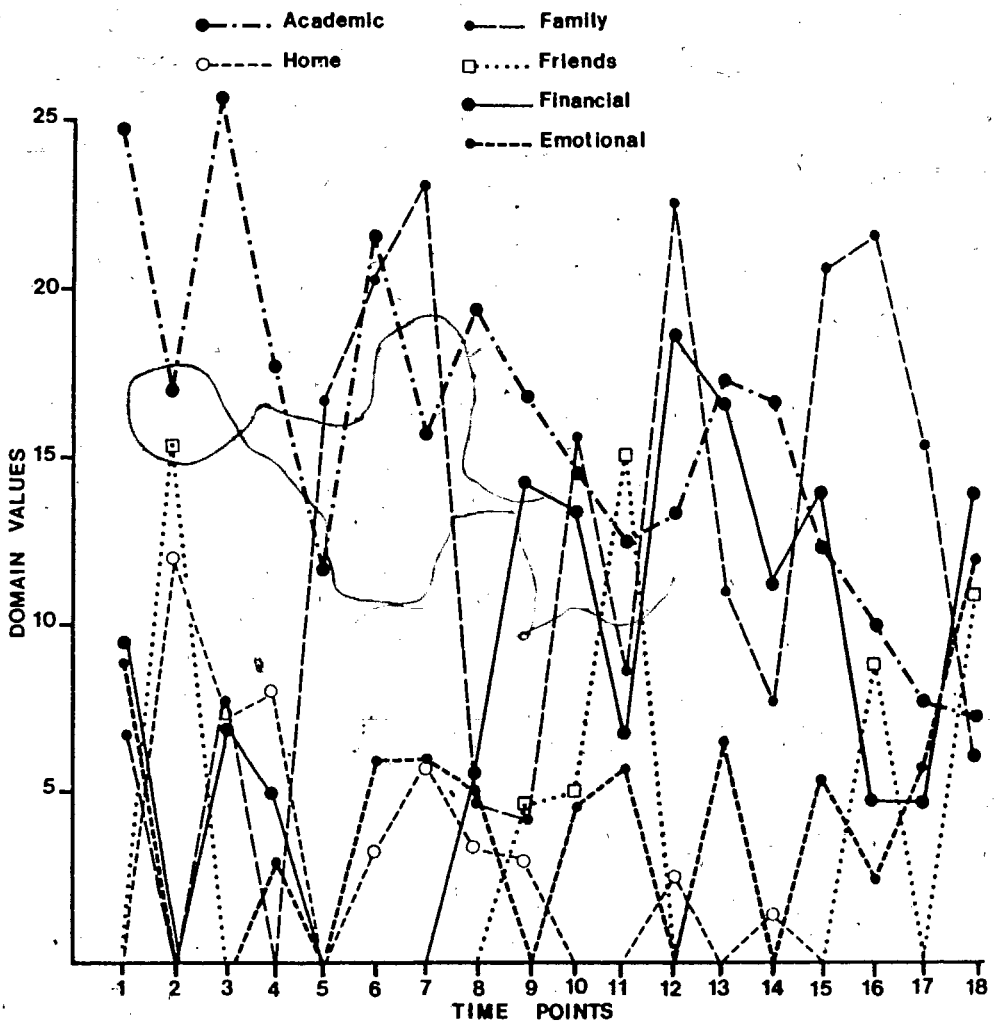


FIGURE 7. Case 3, domain value fluctuations over time. Note. Domain values represent the average domain importance difficulty, enjoyment and importance to QOL raw scores per report.

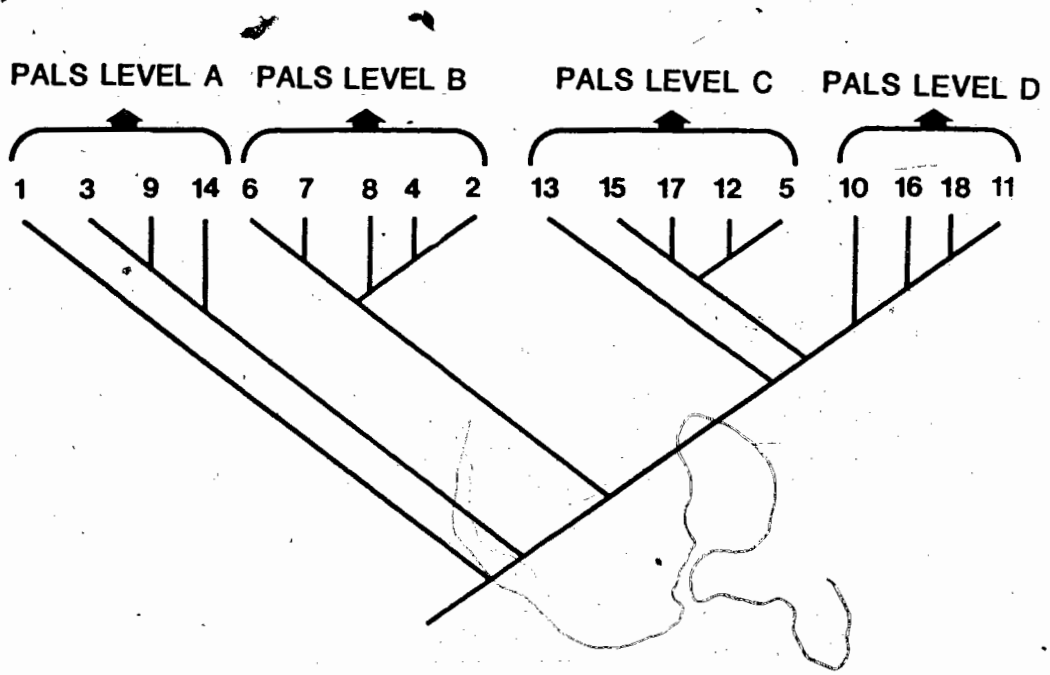


FIGURE 8. Case 3, Wagner tree.
Note. Branch terminals represent PPM time points.

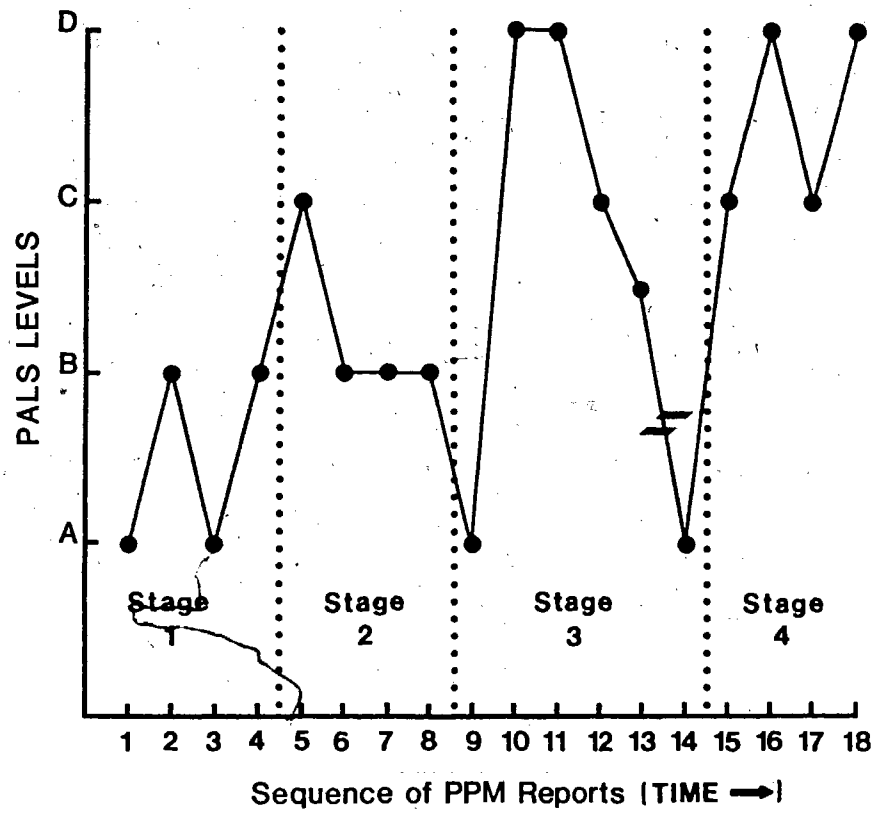


FIGURE 9. Case 3, sequential PPM time points by functional level and stage.
Note. Functional level membership derived from Figure 2. Broken line indicates missing time points.

Variables	% Positive
Number of projects	85.7
Difficulty recreation/health projects	85.7
Enjoyment home projects	16.7
Enjoyment group projects	16.7
QOL group projects	16.7
Importance group projects	16.7
Difficulty group projects	0.0

Table 33. Case 3, more extreme characteristics of downward shifts.
Note. Values represent the percent positive value scores over all 7 instances of downward shifts.

Variables	% Positive
Life satisfaction	100
Number of projects	100
Time discrepancy	100
QOL financial projects	100
Difficulty financial projects	100
Importance financial projects	100
QOL recreation/health projects	0.0
Importance recreation/health projects	0.0
Difficulty recreation/health	0.0
QOL total	0.0
Difficulty total	0.0

Table 34. Case 3, more extreme characteristics of horizontal shifts.
Note. Values represent the percent positive value scores over all 3 instances of horizontal shifts.

Characteristics of the stages also merit cautious examination. Table 35 describes the rise and fall of three domains. The values of the group appraisal variables increased over the stages while those of the career and home domains diminished. While QOL total values increased, life satisfaction and enjoyment toal decreased over the four stages.

Variables	Stages			
	A	B	C	D
QOL total	0.0	0.0	.667	1.00
Importance group projects	0.0	0.0	.500	.500
QOL group activities projects	0.0	0.0	.500	.500
Difficulty group activity projects	0.0	0.0	.333	.500
Enjoyment group activity projects	0.0	0.0	-.500	.500
Life Satisfaction	.500	.500	.500	.333
Enjoyment total	1.00	.500	.500	.250
Difficulty career projects	.500	.750	.333	0.0
Enjoyment career projects	1.00	.750	.500	0.0
QOL career projects	1.00	.500	.500	.333
Importance home projects	1.00	.500	.167	0.0
Enjoyment home projects	1.00	.500	.333	.333
OL home projects	1.00	.500	.167	0.0
Difficulty home projects	1.00	.500	.167	0.0
Enjoyment financial projects	.500	.500	.333	.333

Table 35. Case 3, directional change in stage content characteristics.
Note. Content scores represent the proportion of positive standard scores per stage for the variables noted.

Finally, we wish to examine the stability of the initial variable correlations across the four stages (Table 36, Table 37).

Correlated Variables	r^2	r	P
Enjoyment total & Enjoyment career	.29	.54	.90
QOL total & QOL home	.29	-.54	.90
Importance career & QOL career	.48	.69	.98
Enjoyment career & Enjoyment home	.25	.50	.90
Enjoyment career & QOL home	.67	.82	.95
Importance family & Importance home	.22	-.47	.98
Importance family & Enjoyment family	.48	.69	.95
Importance family & Life satisfaction	.31	-.56	.99
QOL family & Importance home	.31	-.56	.99
Importance home & Enjoyment home	.72	.85	.90
Difficulty home & Enjoyment home	.56	.75	.95
Importance financial & enjoyment financial	.37	.61	.90

Table 36. Case 3, Stable correlations across stages.
Note. P is the probability that all stage correlations represent the same population correlation.

Correlated Variables	r	P
Number of projects & Time discrepancy	.57	.05
Importance career & Difficulty career	.81	.10
QOL family & Difficulty home	-.51	.10
Importance home & Importance financial	-.53	.10
Imortance recreation & Enjoyment recreation	.67	.10
Difficulty recreation & Enjoyment recreation	.47	.05

Table 37. Case 3, Unstable correlations across stages.
Note. P is the probability that all stage correlations are representative of the same population correlation.

DISCUSSION

As outlined previously, two types of issues have been addressed in this study: time-independent and time-dependent descriptions of individuals' activities, and their perceptions of those activities, within a life domain framework. Temporal analysis of the Wagner trees provided support for the existence of directional change in project system content over a one year period. Although we cannot infer either antecedent or subsequent conditions, a dynamic change model over the long term is implied. This, in turn, leads us to more general questions of the change process: its content and dynamics. The following sections deal with these three elements.

TIME-INDEPENDENT DESCRIPTIONS

When viewed in isolation, the time-independent analyses apparently yield a rich descriptive source. However, these results pale in comparison with the much more informative time-dependent analyses which subsume and extend the first analytic level. While the time-independent analyses reveal "normative" descriptions of the individuals, they fail to provide information with respect to change processes over the duration of the study. The most obvious example of this lies in the differentiation between stable and unstable variable correlations: although many significant correlations were found when considering the complete set of data matrices (tables 7, 19, 31), few held up when considered within stages (tables 12, 24, 36). Nonetheless, unique time-independent profiles were

generated for each of the three participants. Both Lucille and Ronny provided portraits of committed graduate-level students whose lives were dominated by the academic domain. In both cases, academic demands clearly conflicted with other life areas, resulting in a truncated set of domain use patterns.

Jane, on the other hand, made use of all the domains, except "friends". Career and family domains dominated with the latter providing a conflictual focus.

TIME-DEPENDENT DESCRIPTIONS

Remember that, according to the original proposition, PALS levels represent escalating levels of information and experience. Thus, it becomes valuable to understand which elements: 1) propel the individual to more distant PALS levels (upward shifts); 2) determine their retreat to more recent PALS levels (downward shifts); 3) maintain their residency within the same PALS level (horizontal shifts). Tables 8, 20 and 32 present characteristics of shifts from more recent to more distant PALS levels. Although each individual manifested this process via different variables, each provided consistent, and personally diagnostic, shift patterns. The same theme held for downward shifts (Tables 9, 21 & 33) and for horizontal (within-group) shifts (Tables 10, 22 & 34).

We have already seen that the characteristics of PALS level shifts differ among individuals. However, the oscillation rate also differs: one indication of this is the differing ratios of upward, downward and horizontal shifts (Table 38).

	Individual Patterns		
	Case 1	Case 2	Case 3
Upward shifts	.25	.26	.37
Downward shifts	.33	.26	.44
Horizontal shifts	.42	.48	.19

Table 38. Ratios of upward, downward and horizontal group shifts for each of the three cases studied.
Note. Ratio figures were calculated as the proportion of total number of shifts for the individual.

It is tempting to construe horizontal within-group shifts as a period of consolidation within a new PALS state. Hence, the highly labile system of the third individual, paired with her steadily decreasing levels of life satisfaction, contrasts with the relatively stable systems of the other two individuals, each of whom featured ever increasing levels of life satisfaction.

With respect to the temporally-based stage construct, most stages contained movements between two PALS levels, although one and three level stages also occur. Figures 3, 6 and 9 also demonstrate that most stage transitions were characterized by upward level shifts. These were not simply artifacts of stage demarcation; the stages clearly exist as discrete movement patterns, each with its own character.

With respect to the stability of variable associations, we find all subjects manifesting a small group of significantly consistent correlative interactions (Tables 12, 24 & 36). These consistent relationships may represent the outcomes of one of three mechanisms; stable within-person characteristics, stable

environmental contingencies interacting with within-person characteristics, or, analytic artifacts of the variance characteristics of the particular variables.

We also find a number of correlative relationships which are significantly unstable over the stages (Tables 13, 25 & 37). Note that a number of these correlations are significant at the .005 level, or better, over all projects. These unstable relationships may indicate the determining role of strong situational contingencies.

The presence of directional change in specific variables is supported by Tables 11, 23 and 35. These point to the longer term waxing and waning of specific life domain areas, as well as to similar processes at the more global level (i.e. "totals" measures & life satisfaction measures).

QUESTIONS OF CHANGE

It may prove helpful to reformulate the global issue of change over time into four component questions: what changes? how does it change? does it change in the same way for all people? and, why does it change? These questions are next discussed in light of the findings of this study.

What Changes?

The ways that the individual both perceives his or her world and behaves within it changes over time. This is manifested in identifiable PALS levels of project systems. The individuals studied moved in a directional manner toward more distant PALS levels. However, this process was not directly linear, but featured oscillations between adjacent PALS levels. These

oscillation patterns were further typified in terms of characteristic stages, such that the mean PALS level of a given stage was generally greater than that of the previous stage.

How Does it Change?

This question must be adressed at two levels: which elements exhibit change? (and which do not?); and, what are the nature of those changes? In the first instance, we found that each individual exhibited a small set of variable values characteristic of shifts to more distant or more recent PALS levels as well as characteristic of horizontal shifts within PALS levels. In contrast with the variables which accompany PALS level shifts were those variables which appeared to be highly labile over time. At the correlational level we also found both stable and labile relationships over stages.

There also existed (for each individual) a set of variables which showed directional change over time. Of course, variable values cannot continue to increase or decrease indefinitely. Therefore, it seems probable that a longer term study would reveal "superordinate stages" whose limits would be defined by reversals or recalibrations of directional variables. As a case in point, we would expect the directional academic variables for Lucille and Ronny to cease upon completion of their academic careers.

In sum, on the one hand, each individual provided a finely grained portrait of the particular elements most strongly associated with their own change processes. On the other hand, each also displayed a wide array of variables apparently

unassociated with change in any systematic way.

Does it Change in the Same Way for All People?

While we cannot talk about all people, after studying these processes in only three, we can certainly compare processes in the three individuals involved in this study. At the general level, all three showed directional change involving temporally-based stages and PALS levels. However, the variables associated with change processes differed between individuals, as did the rate of change and oscillation characteristics between PALS levels.

Given our proposition that change is a manifestation of ever accumulating information and experience, we would anticipate different rates of change to be associated with the individual's contemporary exposure to such factors. Those existing in a rapidly changing and informative universe would be expected to change at a more rapid rate than those resident in a more stable, undemanding milieu. This, of course, presupposes equivalent abilities to abstract information from, and act upon, that world. Clearly, these latter factors must also play a major role. This study featured three intelligent people coping with rapidly changing environments (the first two as graduate students, the third as subject to major career and family pressures).

Given the limitations implicit in such a special sample it is clearly necessary, before more general conclusions can be drawn, to extend investigations to a wider group: professionals, blue collar workers, seniors, children, adolescents,

pathological populations, etc. Of particular interest would be an examination of the impact of external change factors on project system modifications (eg. rapid and/or dramatic external change versus relative external stability). A wider ranging data base would permit us to make more general statements about the range of change rates and oscillation patterns. Ideally, some participants should be followed over much longer time periods (ie. 5-10 years). Such studies would permit investigation of the longer range superordinate change processes and their characteristics.

Why Does it Change?

This question is ultimately philosophical in nature. However, as earlier stated, we began with the thesis that change processes are the result of increases in the informational and experiential stores of the receptive organism which unavoidably occurs over time.

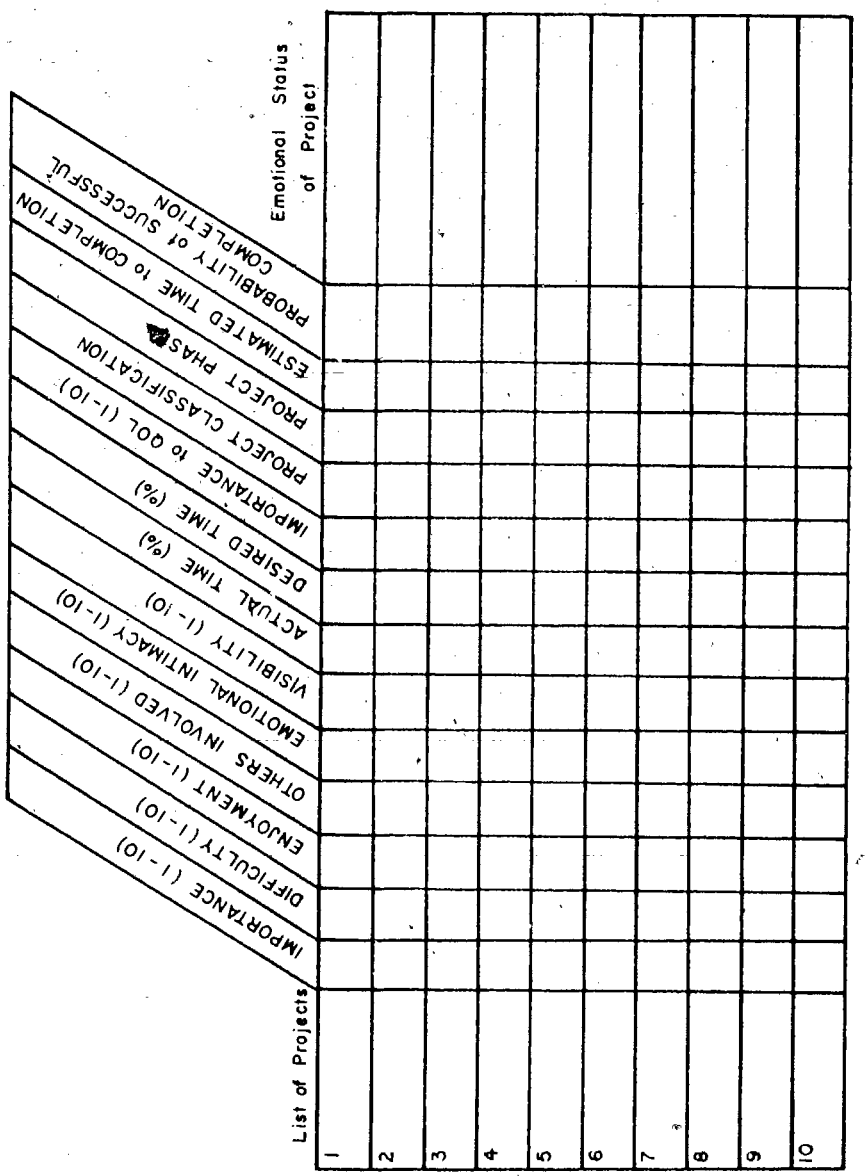
At the more concrete level, the question arises as to whether change processes are caused by their own characteristics (ie variables associated with PALS level shifts) or whether they are the outcome of other causative agents. While it is certainly tempting to infer causality, we must approach this question with great caution. Clearly, this issue rests upon the theoretical framework adopted. As yet, the approach here presented is essentially exploratory and descriptive. As noted above, a much larger body of data will be required for the development of a more sophisticated theoretical position.

CONCLUSIONS

The findings of this study support the principle that certain changes in the individual are directional; this principle applies both to the ways in which the individual behaves as well as to the ways in which the individual construes his behavior. If the original postulate of ever increasing informational and experiential stores holds, these changes cannot, by their very nature, be regarded as reversible. The directional changes manifested by each of the three individuals presented different profiles with respect to overall rates of change on the one hand, and to the oscillation characteristics on the other. Each individual also displayed uniquely characteristic variable constellations associated with upward, downward and within PALS level shifts.

Notwithstanding the preliminary nature and necessarily small scale of this pilot study, the approaches used have provided insights into dimensions of change to which, in the past, little attention has been paid. Extension of this work over longer time spans and with more varied subject pools is now indicated.

APPENDIX A: THE PPM



APPENDIX B: Scoring the PPM Scales

1. IMPORTANCE: How important is each one of the projects to the respondent at the time of the PPM administration (scale of 1 to 10).

2. DIFFICULTY:How difficult does the respondent find the project to do, or to get around to doing (scale of 1 to 10).

3. ENJOYMENT: How much does the respondent enjoy the sctual doing of the project (scale of 1 to 10).

4. OTHERS INVOLVED: How many other people (excluding the respondent) are significantly involved in the project with the respondent (scale of 0 for respondent only, up to a maximum of 10).

5. EMOTIONAL INTIMACY: How close is the respondent to the others involved in the project (scale of 1 to 10).

6. VISIBILITY: How public or private is each one of the projects (scale of 1 to 10).

7. ACTUAL TIME: What approximate percentage of waking time is the respondent actually spending on each project (note that the total may be greater or less than 100%).

8. DESIRED TIME: What percentage of waking time would the respondent like to be spending on each project.

9. IMPORTANCE TO QOL: How importantant is each of the projects to the individuals long term quality-of-life. This scale differs from the first in that we are dealing with the long term implications of the projects (scale of 1 to 10).

10. PROJECT CLASSIFICATION: Respondents classify each project

under the appropriate life domain area: academic or career, family, home, friends, recreation and health, financial, and, emotional concerns.

11. ESTIMATED TIME TO COMPLETION: How long does the respondent think the project will take to complete (note that some projects are ongoing).

12. PROJECT PHASE: Which of the following phases does the respondent place each project in: initial planning, execution or action, completion or termination,disengagement or termination.

13. PROBABILITY OF SUCCESSFUL: How probable does the respondent find successful completion (percent rating).

14. EMOTIONAL STATUS: How does the respondent feel about each one of the projects. This consists of simple descriptive words or phrases.

APPENDIX C: WAGNER ANALYSIS

The Wagner algorithm, developed by Kluge and Farris (1969; see also Farris, 1970, Farris, 1982, Farris, Kluge & Eckardt, 1970), mated the parsimony criteria of Camin & Sokal with the theoretical stance of Wagner. The Camin and Sokal parsimony tree made no provision for evolutionary reversals in contrast with the Wagner tree which does not assume evolutionary irreversability, and thus allows for character state reversals.

Although the Wagner algorithm can be carried out manually, its availability in the PHYSYS program (Farris & Mickevitch, 1981) has greatly extended its range of application. The computer-based version permits analysis of large numbers of characters over a wide array of species.

Prior to the presentation of the basic algorithm, a brief review of the characteristics of the tree may proove helpful. Trees are directed entities in which the root represents a piont chronologically antecedent to any descendent point. The tree is specified in two components: the relative position of the nodes in the branching pattern, and the location of the root. The nodes may be either OTU's or HTU's. However, generally, nodes are HTU's formed at the branching points to minimize the length of the tree. Because tree building operates by a reversal-permitting parsimony criteria, an undirected Wagner network will be of the same length as a rooted, directed, Wagner tree. Thus the length is determined by the data and the direction is determined by the rooting taxon - the ancestor

species.

The following discussion of the actual algorithm is paraphrased from Farris (1970), and the reader is referred to that source for a more complete presentation of the Wagner argument.

The Wagner method operates by adding OTU's one at a time to a tree originally consisting of a single element - the ancestor, or outgroup unit. Even if the ancestor is "hypothetical" in that it is not an existing OTU, it is treated as an OTU. The character states of the ancestor are fixed and not computed by the algorith as are those of an HTU. The sequence in which OTU's are added to the tree is determined by the rank order of the "advancement index". The advancement index refers to the character change distance where the advancement index from the ancestor to OTU I is defined as d(I,A), where A is the ancestor. OTU's with the smallest advancement indices are added first. For each step, the placement of the next OTU to be added is determined by the interval distance formula. A new HTU connecting an OTU to the network is formed by the median-state property (a calculated character distance mid-point).

Thus, Farris gave the basic algorithm as:

1) Select an ancestor, A. Go to 2.

2) Compute the advancement index, AD(I) = d(I,A) for each OTU, I. Go to 3.

3) Find the OTU with the smallest advancement index. Connect it to the ancestor to form a tree with one linkage (one interval). Go to 4.

4) Find the unplaced OTU, B, with the smallest advancement index. Go to 5.

5) Find the interval (linkage), INT (c, f(C)), for C a node of the tree such that d(B, INT (C, f(C)) is minimal). Go to 6.

6) Construct an HTU, Y, as the median of B, C, and f(C). Go to 7.

7) Update the ancestor function:

f(y) = f(c)

f(B) = Y

f(C) = Y

8) If any OTU's remain unplaced, go to 4. Otherwise stop.

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